June 1957

MPM Metal Products Manufacturing

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JUN 4 1957
DETROIT

including finish

SERVING THE *Appliance* AND FABRICATED METAL PRODUCTS INDUSTRY

FROM RAW METAL TO FINISHED PRODUCT

EPON® RESIN does it!

Tough primer on RCA WHIRLPOOL Washers

withstands rugged washday punishment

RCA WHIRLPOOL Washer cabinets on storage conveyors. Finish system includes an Epon resin undercoat, formulated by Grand Rapids Varnish Corporation.

Epon resin-based finish plus careful inspection eliminate customer complaints.

HERE'S HOW...

SOAPS AND MODERN high-strength detergents are persistent enemies of ordinary paint. Because of severe corrosive conditions in some geographical areas, home laundry appliances often show rust stains in just a few weeks of service.

Whirlpool-Seeger Corporation, St. Joseph, Michigan, has found that a primer based on Epon resin gives an outstandingly superior protective finish to its washers, driers, and other home laundry equipment. To maintain the highest standards for coatings, Whirlpool-Seeger set up a system of continuous quality-control testing in their finishing section.

Epon resin-based primers, now standard on RCA WHIRLPOOL Washers, are credited with all but eliminating a major source of field complaints about coating failures.

• • •

If you have a product finishing or paint maintenance problem, you, too, may find that Epon resin-based coatings will do the job better. They have excellent adhesion, high resistance to impact and abrasion, outstanding resistance to moisture, heat, and corrosives. Ask your supplier for Epon resin-based paints and enamels. Write for the full Epon resin coatings story: "*Planning to Paint a Pyramid?*"

Epon resins are the epoxy polymers made exclusively by Shell Chemical Corp.

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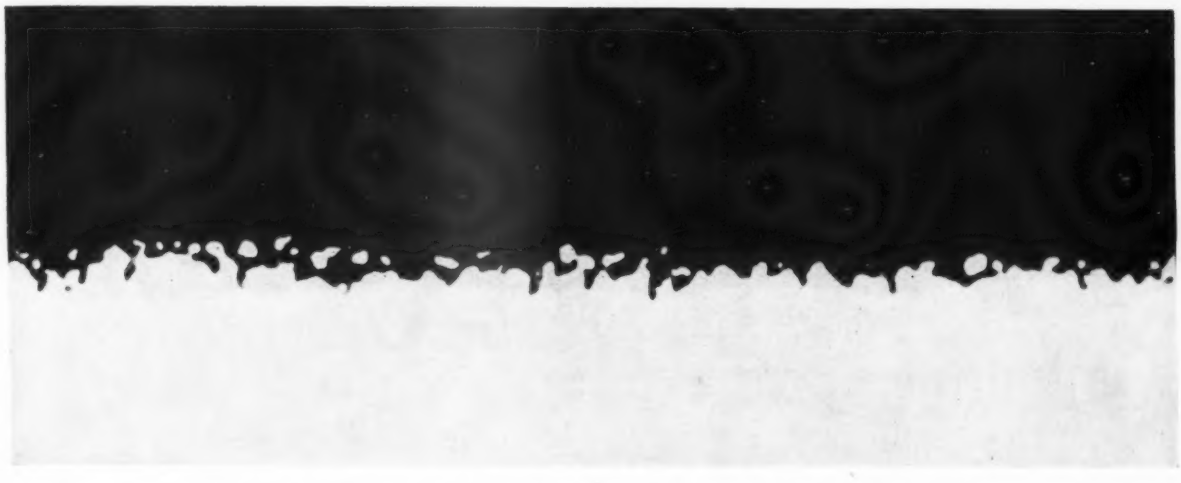
WHY TIGHT ENAMEL-TO-METAL BOND IS ASSURED WITH ARMCO ENAMELING IRON



Tiny projections on the surface of Armco Enameling Iron (below) are only about .000125-inch high. Although you can't even feel them on the surface of the sheet, they hold the finish tightly.

Here's the reason why Armco Enameling Iron provides a uniformly high quality base metal for porcelain enameling:

Little projections—tiny metal "fingers" that are readily formed in the firing process on the surface of Armco Enameling Iron—take and hold the porcelain enamel finish in a tight grip.

But that's not all. In addition to lifetime bond, Armco Enameling Iron offers all these other important advantages.

. . . No sag at firing temperatures of established high quality frits.

. . . A special surface designed to help drain enamel evenly.

. . . Smudge-free surface that cuts pre-cleaning time.

Here's Why It's No. 1

Unlike many metals used for porcelain enameling, Armco Enameling Iron is made *only* for porcelain enameling. Every step of its production—from open hearth to final inspection—is closely controlled to make it the highest quality enameling sheet you can use.

Our catalog, "Armco Enameling Iron," tells the full story about this superior base for porcelain enamel finishes. Write us for a copy.

ARMCO STEEL CORPORATION

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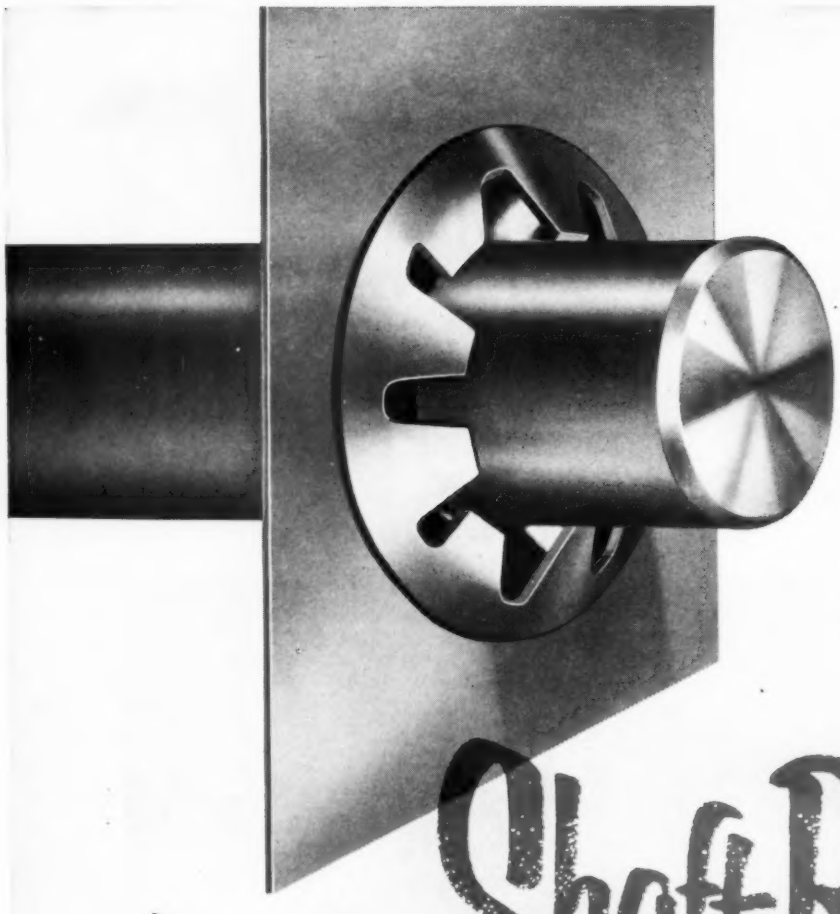
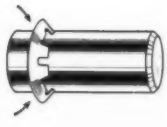
SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION



Pilot teeth guide fastener on for easy hand starting.



Hardened spring steel teeth bite in, resist dislodging force.

for positive Shaft Retention

FASTEX® SPRINGRIP FASTENERS

Simplify assembly, save costs! Springrip Fasteners are simple to apply to rods and studs . . . assure exceptional strength without special preparation . . . no costly threading or drilling required. Standard Springrip Fasteners with pilot teeth now in stock and available for immediate delivery. Full details on all cost-saving Springrip Fasteners and other Fastex Shaft Retention Fasteners are found in new Fastex Catalog No. AF-9. This important booklet contains complete technical data, dimensions and application suggestions. Write for your catalog today!

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June • 1957

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METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $8.00 per year, domestic. To all other countries $10.00 per year (U.S. funds). Single copies, $1.00.

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look for it on the heat and corrosion resistant alloy castings you buy—

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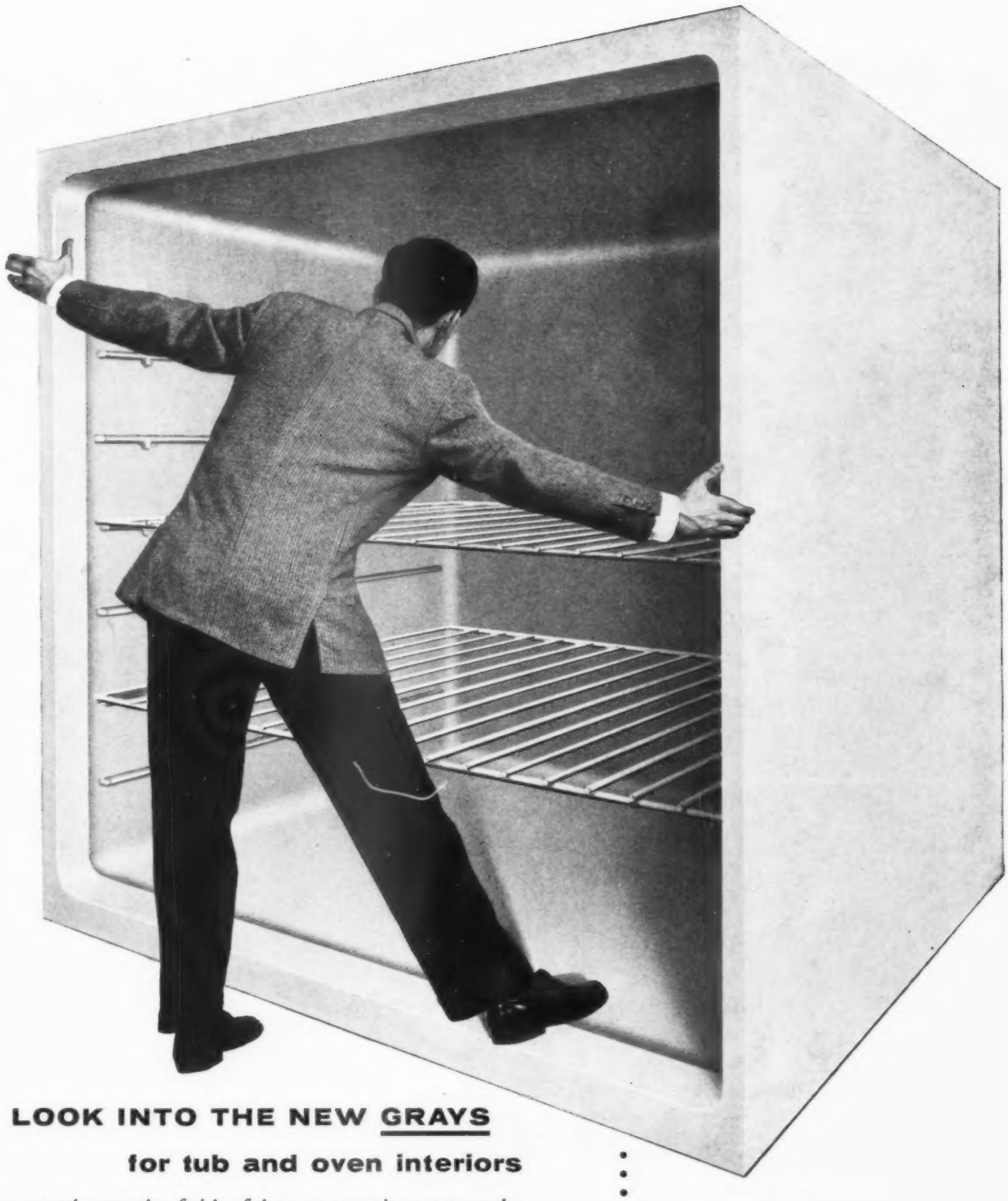

LOOK INTO THE NEW GRAYS

for tub and oven interiors

The smooth, attractive finish of the new gray vitreous enamel ground coats will give you one good reason why they're becoming more popular. On the practical side, they have better resistance to alkalies—keep their good looks longer.

Using TAM OPAX* and OPAX S* as the mill addition opacifier—a number of finishers report enamel working properties they are unable to get by any other means.

Reason enough to write for a sample package of OPAX.* Your request to our N.Y.C. office will receive prompt, personal attention.

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Mr. John S. Lea, Vice President, Kelley Manufacturing Company, Houston, Texas, reports:

"Republic Electro Paintlok® forming and application

"Republic Electro Paintlok is the ideal material for one of our major product lines, acoustical fastening members," continues Mr. Lea. "Fabricating the sheet into H and Z members, splines, angles and couplers requires extreme forming and bending. We know from past experience that the special coating on Republic Electro Paintlok won't crack, flake or peel off no matter what we do. This means that after painting and installation, Kelley Acoustical Fastening Members provide our customers maximum satisfaction almost indefinitely, with little or no maintenance at all."

This example is typical of the improvement made possible in an endless variety of products through the use of Republic Electro Paintlok. In addition, this versatile sheet often allows substantial savings in production time and money because it is shipped from the mill in prime condition for painting. In many cases only the final finish need be applied to provide full protection and attractive appearance. Cleaning and priming may be eliminated.

Finally, the chemically treated zinc surface of Electro Paintlok retards corrosion even when scratched through, and effectively limits it to the point of damage.

Get all the facts on this versatile sheet steel product and how it can help solve your forming and application problems. Simply contact your Republic representative or mail coupon.

REPUBLIC CONTINUOUS GALVANIZED solves a wide variety of production-line product problems requiring inexpensive, long-lasting corrosion protection. Its uniform, tight zinc coating won't crack, peel or flake off under the most severe forming operations. Completed products are positively protected without the expense of individual hot dip galvanizing after forming. For facts, send coupon.

REPUBLIC ENDURO® STAINLESS STEEL provides the perfect solution to end products which must withstand corrosion, heat, abrasion and impact. ENDURO provides life-time beauty, untarnished by time. Even under severe weathering conditions, simple washing restores its full brilliance. No further maintenance is required. For the complete story on ENDURO, mail coupon today.

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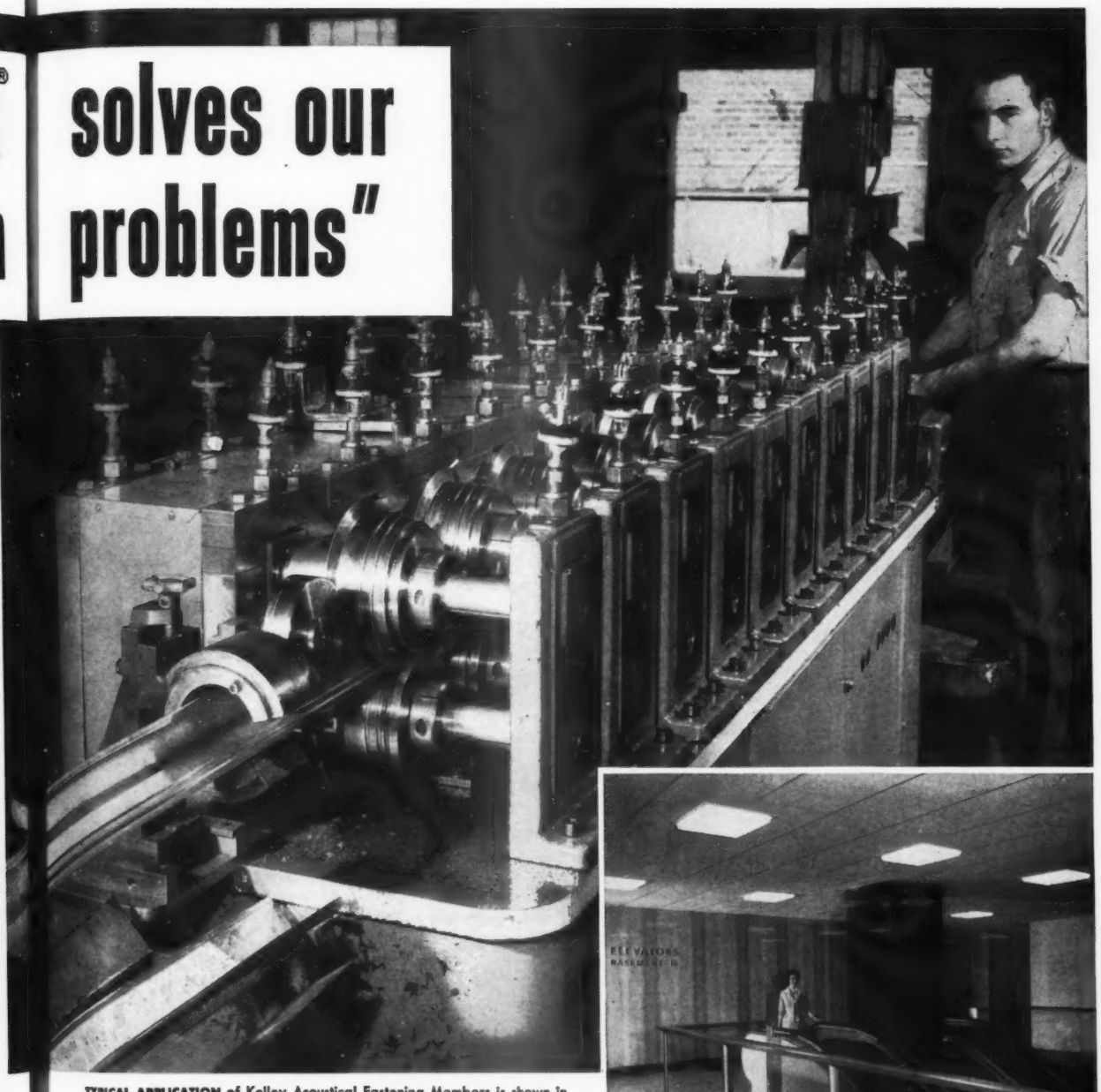
World's Widest Range of Standard Steels

solves our problems"



TYPICAL APPLICATION of Kelley Acoustical Fastening Members is shown in the ceiling at right. Base metal is Republic Electro Paintlok. Its special coated surface grips paint tightly, assuring years of maintenance-free good looks. Even severe forming, like the operation shown above, has no effect on its outstanding paint-holding characteristics. Coating will not crack, flake or peel off.

STEEL

and Steel Products

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THE finish LINE

WHERE ARE THE TEARS

— that many expected to see flowing as soon as there was any tapering off of production or sales in any of the principal divisions of the Appliance and Metal Products industry? It is certainly true that first quarter figures for many sections of the industry are not up to the peak years immediately preceding, yet the expected wailing is not too much in evidence.

MPM editors have covered a number of important meetings during recent weeks, such as GAMA, AHLMA, ARI, PEI, representing national groups, and at least two sectional meetings on the West Coast. While at none of these sessions could it be reported that the industry representatives were doing much boasting about first quarter statistics, it certainly can be said that in each case the general tone of the meetings was one of optimism rather than pessimism. And more important, there was strong evidence of getting down to business to do something about the *sales* and production problems facing each group.

There seems to be a feeling, certainly a healthy one, that a continuing skyrocketing of the business curve for home appliances and similar metal products can not be expected to continue of its own volition, irrespective of outside influences. It also appears that good solid merchandising planning and a re-appraisal of sales and advertising plans are becoming an actuality instead of subjects for lip service.

Bright spots in business

Then too, there are many bright spots in the metals picture — cases where individual segments of the industry and individual companes in varied lines have *increased* production and/or sales in the first quarter of 1957 over the preceding year.

Here are just a few examples taken at random from the current news releases: *Armco Steel Corp.* reports first quarter sales totaling $198,205,419 compared to $189, 958,-346 in the first quarter of 1956 — *Inland Steel Co.* reports new quarterly records for sales and steel output in the first three months, with earnings at a new first quarter record — *Pittsburgh Plate Glass Co.* reports sales totaling $150,-900,654 for the quarter, representing a 5 per cent increase over last year's first quarter — *Pennsalt's* first quarter sales showed an increase of 10.8 per cent over the same period for 1956 and a 15.7 per cent increase in profits.

Foote Mineral Co. reports a quarterly sales record of $6,661,114 with earnings up 22 per cent — *Borg-Warner Corp.* sales for the quarter showed a gain of 1.2 per cent — *National Lead Co.* reports a quarterly increase of 3.2 per cent in sales for the quarter over the 1956 period and an increase in earnings of 8 per cent — *Crown Zellerbach* Corp. achieved new first quarter records in sales and production with net sales at $110,700,000 — *Acme Steel Co.* reports first quarter sales of $44,213,939 – an increase of 40.6 per cent over the corresponding quarter of 1956 and an increase of 16.6 per cent in net income after taxes.

In the equipment field, *Resistance Welder Manufacturer's Association* reports March as representing the seventh successive month in which monthly shipments have exceeded $3,000,000 with March nearly 40 per cent over February. Industry backlog is listed as near the $13,500,000 mark.

In the components field are *Controls Company of America* with first quarter earnings up 24 per cent on first quarter sales totaling $7,245,454 — *Minneapolis-Honeywell Regulator Co.* with sales and earnings for the first quarter the highest for any comparable quarter in company history.

Other familiar names in the Appliance and Metal Products field showing increases are *General Electric* reporting first quarter sales and earnings at top levels, with total sales of $1,048,900,000 resulting in profits of $64,000,000 — *Westinghouse Electric Corp.* with a quarterly sales billing of $475,686,000 compared to $225,366,00 and a net income of $14,198,000 compared to last year's strike-bound first quarter loss of $18,575,000 — *Worthington Corp.* showing quarterly net income of $2,106,258 and reporting an increased backlog of orders — *Trane Co.* reporting sales of $18,631,203 and earnings of $1.170,473 – both ahead of last year's figures.

How about appliances?

There are a few bright spots in the appliance and home product categories although, as our readers well know, the major appliance items show decreases for the quarter.

February sales of *Vacuum Cleaners* were the second largest for the month in the industry's history.

Dishwashers show a slight increase in sales for this year in a report for the first two months.

Built-In Ranges, as might be expected, continue to show an increase in sales.

As in the case of the product groups, there are individual companies reporting increased production and sales figures: *Norge* reports factory sales of home freezers and refrigerators for the first quarter at 14 per cent over the corresponding 1956 period. Norge also reports production schedules for various appliances set from 49 per cent to 88 per cent ahead of last year—*Philco* shows a healthy increase in sales for the quarter, but in this instance, profits did not follow the same curve.

A healthy sign in *Television* production shows in a report by RETMA that the cumulative sales during the first three months of this year were above production by nearly one-quarter million receivers.

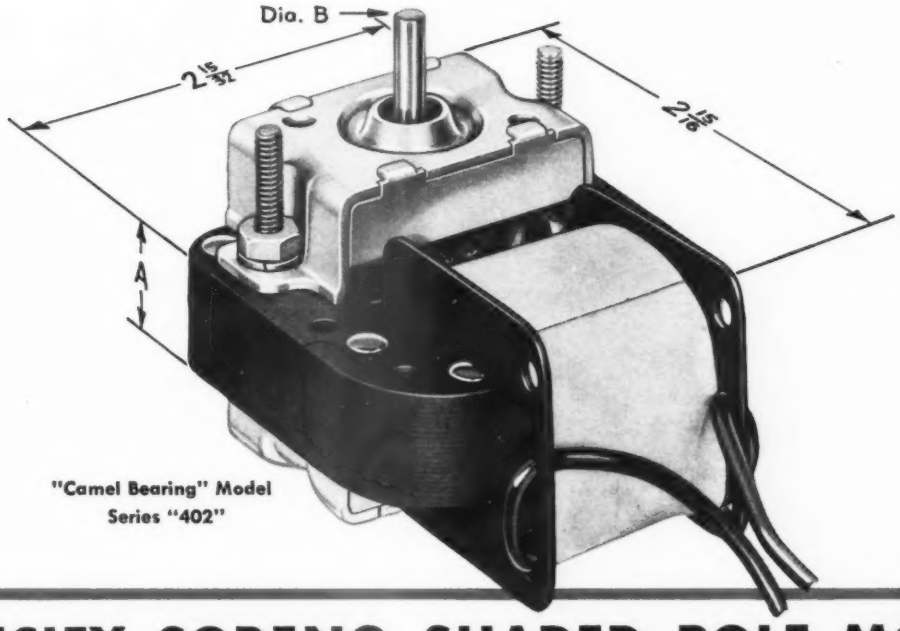
So there it is

The situation in the Metal Products Field is certainly nothing to wave flags about, but by any reasonable historical measuring stick, it certainly isn't anything to cry over.

It might be said that the current "settling out" period may be what was needed to bring some segments of the industry and some individual producers to the point of girding for the real battle ahead — the battle of increasing the total market for Metal Products over the long pull — the battle to get a fair share of the tremendous potential which the top research minds all say is on the way.

Dana Chase

EDITOR AND PUBLISHER



"Camel Bearing" Model
Series "402"

SPECIFY SORENG SHADED-POLE MOTORS

Where Economical, TROUBLE-FREE Operation is a Must

Series "401"

Series "401" for Standard Life Applications

Here's a tough, durable Shaded-Pole Motor. The "401" has positive aligned bearings with self-aligning features and an open-skeleton frame for effective heat dissipation. You have your choice of 12 models. You'll find a "401" Shaded-Pole Motor that meets your needs exactly.

Series "402" with New CAMEL BEARING Holds Lubricant Thousands of Hours Longer

The "402" Shaded-Pole Motor is built to last. It's a rugged little powerhouse with an EXTRA long life due to its exclusive, new CAMEL BEARING design. This special bearing bracket provides automatic, positive oil circulation even under high temperatures. Oil is constantly feeding into bearing cavities as operating conditions demand.

The "402" is made of high quality, silicon steel. It's versatile, too! The rotor bracket is easily removed so that the motor can be adapted to a variety of field applications. Standard mounting holes make it interchangeable with other motors. Range of 12 models cover all types of applications.

MODEL NO'S (2)	402-10 402-11 401-10 401-11	402-20 402-21 401-20 401-21	402-30 402-31 401-30 401-31	402-40 402-41 401-40 401-41	402-50 402-51 401-50 401-51	402-60 402-61 401-60 401-61
VOLTS	115	115	115	115	115	115
FREQUENCY	60	60	60	60	60	60
AMPERE—NO LOAD	0.31	0.42	0.55	0.64	0.97	1.31
WATTS—NO LOAD	13.5	19	24	27.7	40	53
R P M—NO LOAD	3400	3480	3500	3570	3560	3550
MAX. HP. OUTPUT(1)	1/500	1/200	1/125	1/75	1/50	1/40
START TORQUE OZ. IN	0.58	1.4	2.3	2.3	3.3	4.9
STALLED WATTS	18	29	40	45	68	98
STACK WIDTH "A"	3/8"	5/8"	3/4"	3/4"	1-1/8"	1-1/2"
SHAFT DIA. "B"	0.182	0.182	0.182	0.182	0.2178	0.2178
WEIGHT—POUNDS	0.8	1.2	1.4	1.6	1.9	2.4

SORENG SHADED-POLE MOTORS HAVE OVER 140 PRODUCT APPLICATIONS

Typical Applications include: springwire, gear, chain, rubber belt and friction drives or, to move high velocity, heater or sirrocco air.

NOTES:

1. HP RATING AT 3000 RPM—CONTINUOUS DUTY FAN LOAD
2. ALL NUMBERS ENDING IN "0" DENOTE CLOCKWISE SHAFT ROTATION ALL NUMBERS ENDING IN "1" DENOTE COUNTER-CLOCKWISE SHAFT ROTATION
3. 402—LONG LIFE SERIES
4. 401—STANDARD LIFE SERIES
5. LEADS—#20AWGX 7" LONG LEAD WIRE THERMO PLASTIC

Send for your copy of Soreng's new booklet on Shaded-Pole Motors. It contains drawings, technical data and specific applications.

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Manufacturers of *SORENG* controls
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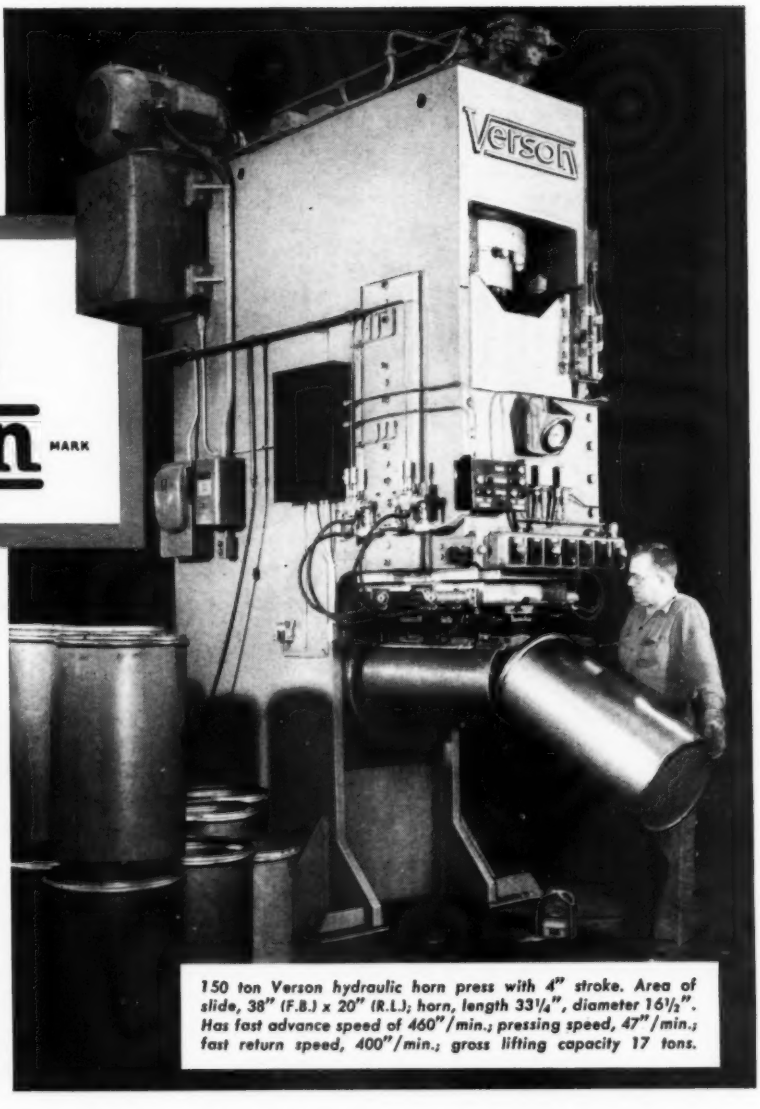
controls that make modern living possible

150 TON

TRADE **Verson** MARK

hydraulic HORN PRESS

coins and pierces openings on power line transformer containers



150 ton Verson hydraulic horn press with 4" stroke. Area of slide, 38" (F.B.) x 20" (R.L.); horn, length 33¼", diameter 16½". Has fast advance speed of 460"/min.; pressing speed, 47"/min.; fast return speed, 400"/min.; gross lifting capacity 17 tons.

This 150 ton Verson hydraulic horn press is in use at the Gadsden, Alabama, Works of Allis-Chalmers Manufacturing Company.

The press is employed to automatically coin and pierce 3 different openings, to accommodate various sized leads coming into power line transformer containers. When actuated, the press has a two stroke cycle. A combination coining and piercing die coins the part on the initial stroke—the second stroke is a piercing operation.

The press is equipped with full automatic electrical control and has varying tonnage control for each of the three stations. By preselection, the operator may exert the proper tonnage required to do each specific job.

This hydraulic horn, like all Verson machines, is much more than just a press. It's a production process, engineered and built to provide greater efficiency and production with reduced costs.

Put Verson's production know-how to work for you. Send an outline of your requirements —we'll make specific recommendations.

A Verson Press for every job from 60 tons up.

TRADE **Verson** MARK

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HIGH QUALITY SHEET AND STRIP

for aircraft

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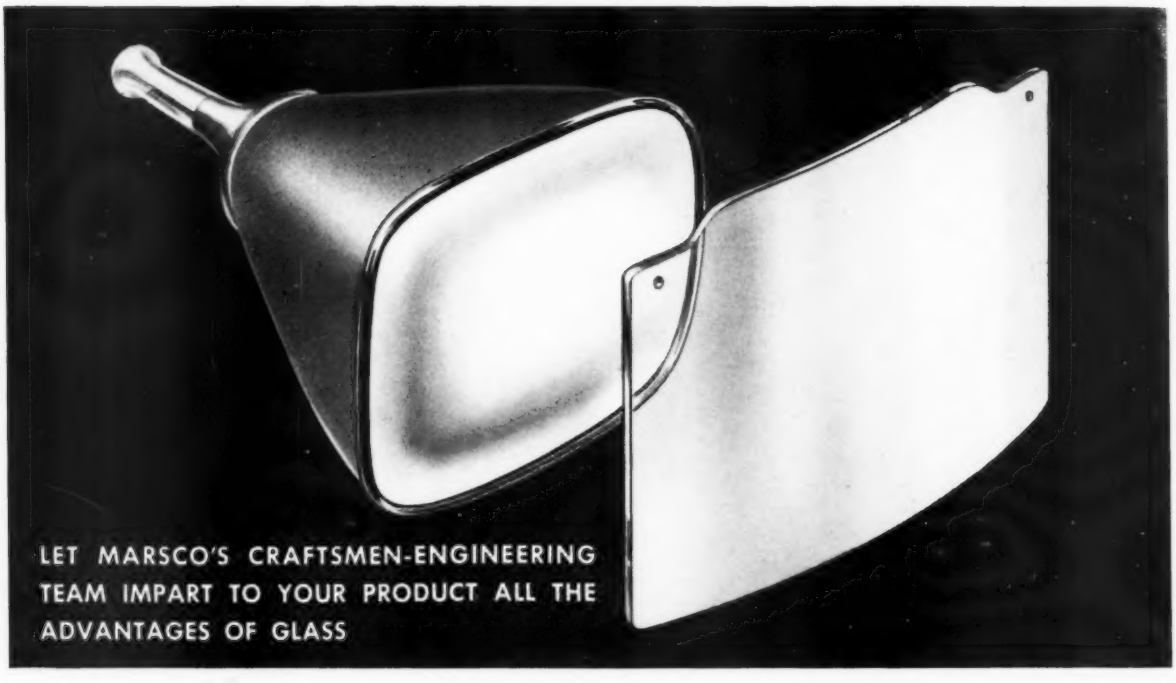
for the Finest in PRECISION GLASS PARTS!



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Here are some of the applications for Marsco heat-treated, tempered and hardened glass parts:

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Special Shapes for: Instruments, Gauges, Household and Industrial Appliances.

Marsco

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INDUSTRY MEETINGS

REFRIGERATING ENGINEERS

The American Society of Refrigerating Engineers Annual Meeting, Hotel Fontainebleau, Miami Beach, June 2-5.

APPLIANCE MANUFACTURERS

Institute of Appliance Manufacturers 25th Anniversary Convention and Exhibit, The Netherland Hilton, Cincinnati, Ohio, June 3-5, 1957.

EDISON INSTITUTE

Edison Electric Institute Annual Convention, Chicago, Ill., June 3-5.

HEATING & AIR CONDITIONING

National Warm Air Heating & Air Conditioning Assn. Summer Convention, Fairmont hotel, San Francisco, Calif., June 5-7.

OPERATIONS RESEARCH

Operations Research Conference, sponsored by Illinois Institute of Technology, Illinois Institute of Technology campus, Chicago, June 12-14.

PRESSED METAL INSTITUTE

Pressed Metal Institute National Sales Conference for Metal Stampers, Hotel Carter, Cleveland, Ohio, June 14, 1957.

TESTING MATERIALS

American Society for Testing Materials Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, June 16-21.

HOME FURNISHINGS

International Home Furnishings Market, The Merchandise Mart and American Furniture Mart, Chicago, June 17-28.

BOX ASSOCIATION

National Wooden Box Association annual summer meeting, Lake Placid Club, Essex County, N. Y., June 24-26.

HOUSEWARES

National Housewares Mfrs. Assn., National Housewares Exhibit, Atlantic City Auditorium, Atlantic City, N. J., July 8-12.

ARCHITECTURAL METAL

The National Association of Architectural Metal Manufacturers First Annual Architectural Metal Institute, Northwestern University (downtown campus), Chicago, July 14-20.

ALUMINUM
PERMANENT MOLD
CASTINGS
ITEM No. 1
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Items No. 1 and 2 are standard. Other Griddles for gas and electric ranges are custom made with our exclusive DURAGLAZE or SATIN finishes. They are most popular because they do not discolor easily and cleaning is quick and simple.
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IMPORTANT ANNOUNCEMENT:
INCREASED PRODUCTION OF
USS VITRENAMEL
STEEL ENAMELING SHEET
FOR '57!
1957 is the year new VITRENAMEL facilities will get rolling at United States Steel's Irvin Works, near Pittsburgh, Pennsylvania. That means that this quality enameling base sheet—which frequently has been in short supply—will soon be available in larger quantities to help meet increasing demands.
USS VITRENAMEL—so carefully produced from the open hearth furnace to the finished sheet—is an ideal enameling base. USS VITRENAMEL makes a permanent bond with the porcelain enamel, which, when applied to USS VITRENAMEL, is highly resistant to chipping, cracking and other types of failure. USS VITRENAMEL will be available in coils.
For additional information about USS VITRENAMEL, write or telephone the nearest United States Steel Sales Office.
UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL EXPORT COMPANY, NEW YORK
USS VITRENAMEL
Registered Trademarks
USS
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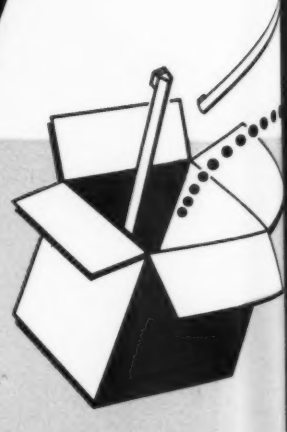
Announcing!

Plastic Spacer A
as a Thermo-Br



7 Standard Models Available to You

In the new Mills line you have a selection of distinctive designs available immediately at standard production prices.

7 STANDARD MODELS—4 STANDARD PATTERNS

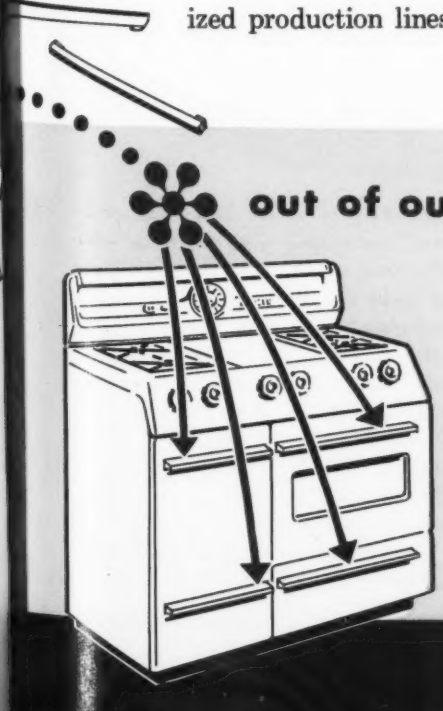
a new MILLS PRODUCTS *service...*

PERMA-GRIP Handles

* Mills Products, Incorporated, manufacturer of the now universally accepted PERMA-VIEW oven door window, used by the leading manufacturers of gas and electric ranges, announces a new service for appliance manufacturers—PERMA-GRIP handles.

You can now purchase your appliance handles built to Mills' quality standards. Seven standard models are offered and four standard patterns are available on any model handle. All handles have plastic spacers which serve as a thermo-break. If you wish, consult with our engineering department regarding special custom requirements.

We have the skilled personnel, the specialized equipment, and we use the right materials to assure a reliable source for quality PERMA-GRIP handles. Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on PERMA-GRIP handles.

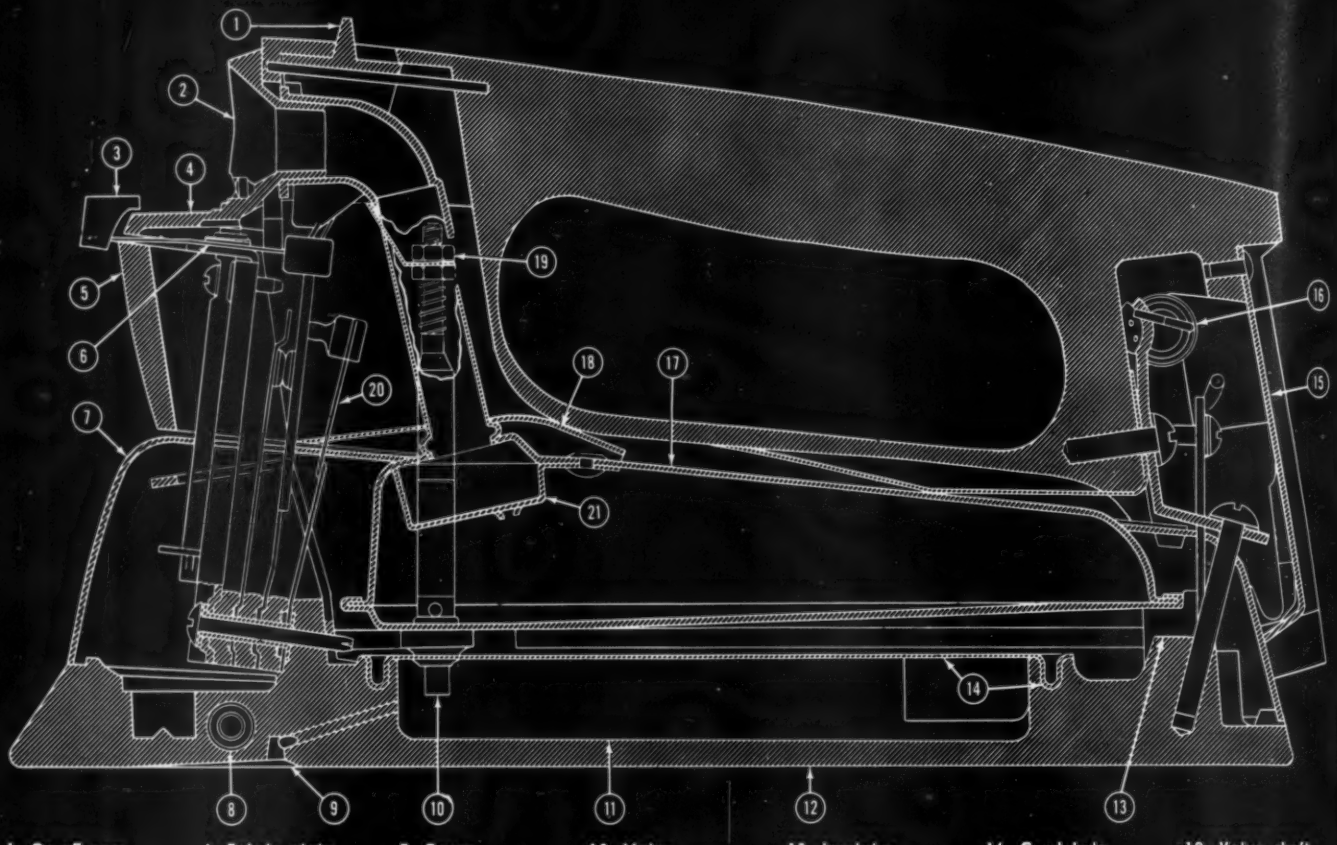


out of our carton—onto your door!

THE WINDOW YOU CAN SEE THROUGH ALWAYS

MILLS PRODUCTS INCORPORATED

1015 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN



Design features of the "Mrs. America" steam and dry iron

engineers were assigned the job of designing a completely new steam-dry iron for the Proctor Electric line—here is the end result, including features

EXECUTIVES of Proctor Electric Company, Philadelphia, decided to assign to engineering the task of designing a completely new steam and dry iron. The engineers were told to throw convention to the winds in their planning and to add every feature possible that would add to the convenience and utility of the appliance in the home and that would serve as an effective feature for a sales and advertising program. In other words, the hoped for result was an appliance that could be termed a designer's, as well as a housewife's, dream. On these pages we present the product which the company is currently introducing as a result of the engineering study. Proctor makes a specific point of the fact that practically all functional parts represent a complete break from tradition in steam iron design.

Vertical thermostat

The feature represented by the company as the key engineering development is the vertical positioning of the thermostat.

Normally, the company points out, thermostats in steam irons are positioned horizontally just above the soleplate. They point out that this positioning limits the space available for generating steam to a small triangular area at the tip of the iron. They say, too, that horizontal positioning limits volume and poses a problem in venting steam to the central soleplate work area.

Proctor lists the following advantages as resulting from the vertically positioned thermostat:

1. The steam generating area has been tripled.

2. Steam can be vented uniformly over practically the entire soleplate.
3. Resulting space saving permits the installation of an oversize water tank.
4. Thermostat contact points can be located in a cooler, cleaner area.
5. A direct coupled dial and control cam greatly reduces the temperature differentials of linkage systems. *(The company states that linkage can cause a temperature differential of 30 degrees at a given setting, depending upon the direction in which the dial is turned.)*

Proctor claims that this is the *only* steam-dry iron including *all* of the following six features:

1. Seventeen steam vents.
2. Ample steam for all fabrics.
3. Oversize, full-view soleplate.
4. Instant changeover, steam to dry.
5. Full, even steam distribution.
6. Flash-type steam generation.

Additional claims for the engineering features include the following:

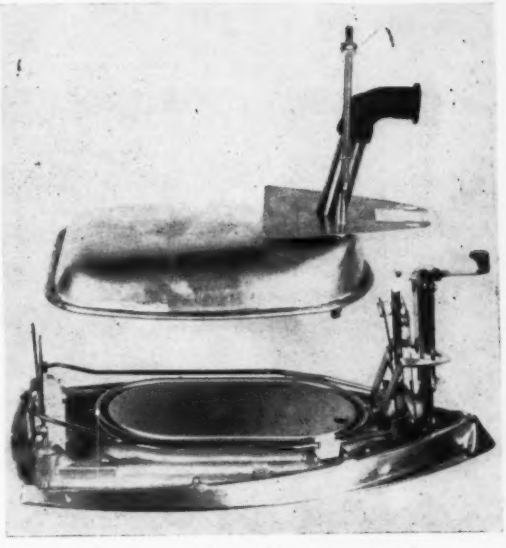
The oversized tank holds sufficient water to provide "clouds" of steam for more than one half hour. A wide filler hole permits easy filling and emptying and is located high on the handle to reduce the possibility of water spillage.

Seventeen steam vents

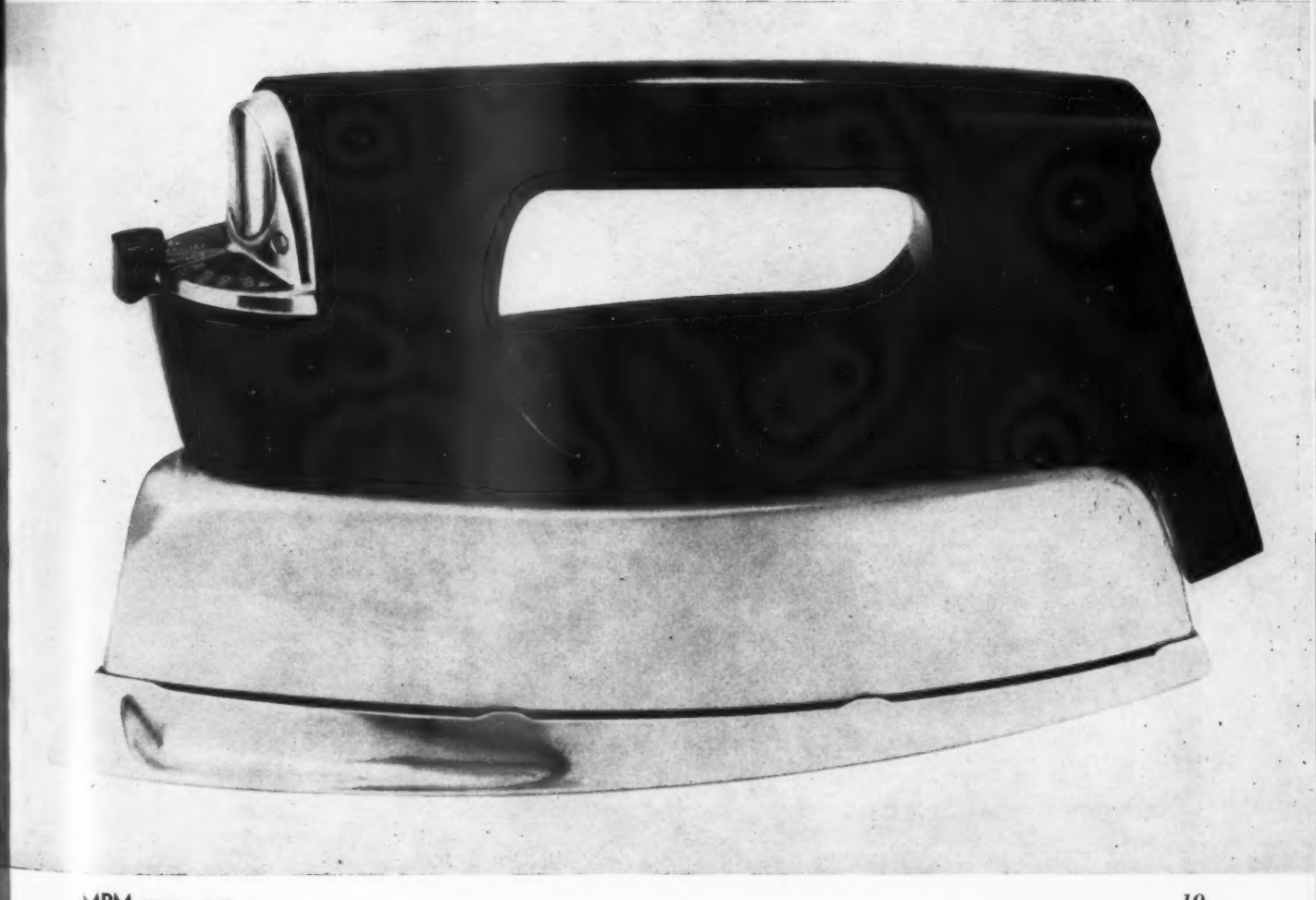
The seventeen equally-spaced steam vents are for the purpose of distributing steam evenly over the soleplate area. The "full-view" soleplate affords complete visibility while ironing in any direction, and its large size covers a maximum area. The service cord can be changed for right or left handed ironers, and dual thumb rests are designed to minimize fatigue for either right or left handed ironers.

It is stated that steam will develop from cold water in just two minutes. The one piece molded plastic handle incorporates a tilt back heel rest and the rate of heat transfer is said to make the iron comfortable to grasp and safe to leave standing while turned on.

This new Mary Proctor "Mrs. America" steam and dry iron has been built to retail at $15.95.



By comparing this photograph with the drawing on the opposite page, readers can get a clear conception of the engineering features of the Mrs. America steam-dry iron.



New horizons in product design with...
NICKELOID METALS
More Than a Metal—It's a Method
Beyond the design and production limits of ordinary metals rises Nickeloid Pre-Finished Metals, a versatile design material that transforms design ideas into product realities. Available in 14 finish-to-base metal combinations, this finished raw material opens wide new horizons in product design, adapts readily to standard production methods, inspires new products — new designs. Saves production time, costs and equipment investment, too, because it's PRE-finished.
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CHROME, NICKEL, COPPER AND BRASS FINISHES ON BASE METALS OF STEEL, ZINC, COPPER, BRASS OR ALUMINUM. SHEETS, STRIPS, COILS.
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from the Editor's Mail

wishes magazine regularly

Gentlemen: I have read copies of your publication, "METAL PRODUCTS MANUFACTURING", and consider it extremely informative. It is understood that this publication is distributed without charge to executives and department heads responsible for production engineering.* In view of this I would like to be placed on your mailing list to receive the magazine regularly. I am sure it will help to keep our Production Engineering department aware of the latest developments in products and processes.

Your attention to this matter will be greatly appreciated.

S. S. Hammond, Sr. Prod. Engr.
Production Engineering Section
Designers for Industry Inc.
Cleveland 9, Ohio

Ed. Note: I should like to acknowledge your letter of March 21. We are pleased to learn of your interest in our publication, and will be glad to see that your name is added to our circulation list. You will begin receiving the publication effective with our April issue.

liked Mueller article

Gentlemen: Thank you for the opportunity to examine the story on our esteemed competitor in the Mueller Climatrol Division contained in your February issue.

I was very much interested in the specific comments of Frank Nunlist and H. P. Mueller. It is to be regretted that we do not have more people of this type in our particular business.

T. W. McNeill, President
American-Standard
Air Conditioning Division
Elyria, Ohio

hails our progress

Gentlemen: It has been with great interest that I have been watching the remarkable progress of your magazine. I remember the day when you first started, and I cannot help but marvel at the progress you have made.

You certainly are to be complimented for your fine publication.

James A. Bede, President
Bede International Development Co.
Cleveland 7, Ohio

a long-time reader

Gentlemen: Our key personnel now receive and read your fine publication with interest.

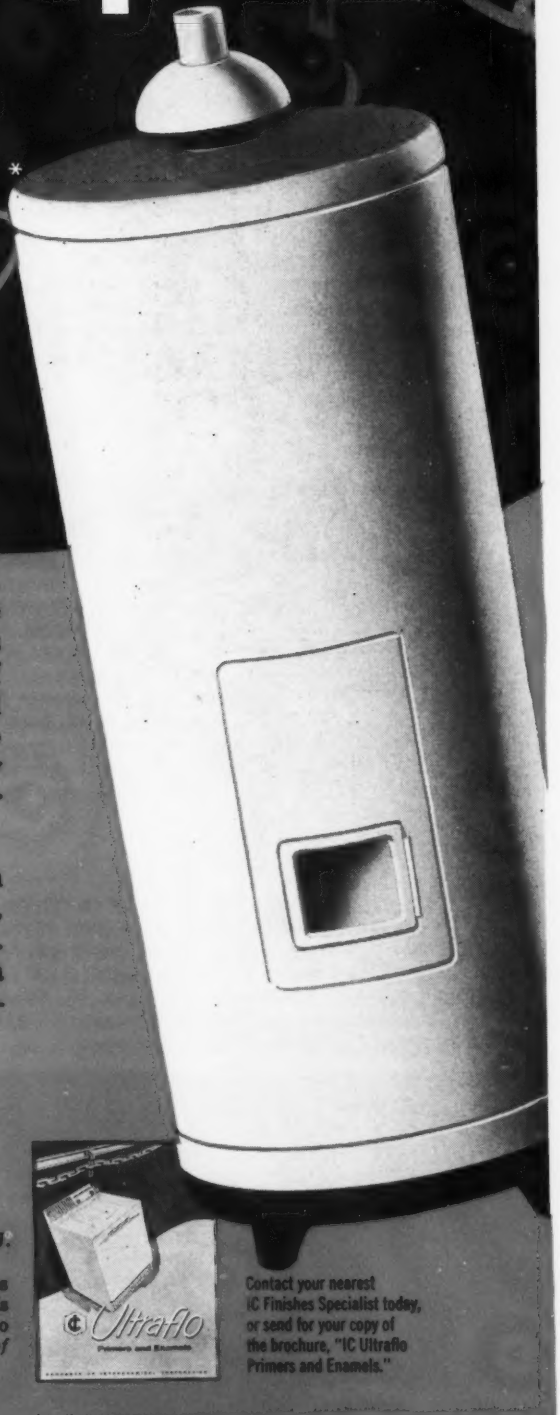
From the first issue I do not think I have missed a copy. You are doing a fine job covering the industry. My sincere thanks.

Frank B. Gibson, V.P.-Production
Seaporcel Metals, Inc.
28-20 Borden Ave.
Long Island City, N. Y.

Flowcoat Topcoats

Proven in production runs by major manufacturers with

Ultraflo* ENAMELS



When IC Ultraflo Enamels were announced last fall, many found it difficult to believe that you could flowcoat topcoats on objects with large surface areas and long lines of flow. Aggressive manufacturers demanded proof with the result that today IC Ultraflo Enamels are constantly chalking up new triumphs in production runs, even under extremely adverse plant conditions.

You'll be amazed at the beautiful flow, high gloss, freedom from sags, runs or pinholes, and minimum supplemental spray needed. You'll get higher production speeds with a practically automatic operation and substantial savings in materials.

Interchemical
CORPORATION
Finishes Division

Headquarters Office: 224 McWhorter Street, Newark 5, N.J.

Factories: Chicago, Ill. • Cincinnati, Ohio • Elizabeth, N.J. • Los Angeles, Cal. • Newark, N.J. • Mexico City, Mex. In Canada this product is made by Aulcraft Paints Limited, Toronto, Ontario and sold under its trademark. **IC and Ultraflo are trademarks of Interchemical Corporation.*

Contact your nearest IC Finishes Specialist today, or send for your copy of the brochure, "IC Ultraflo Primers and Enamels."

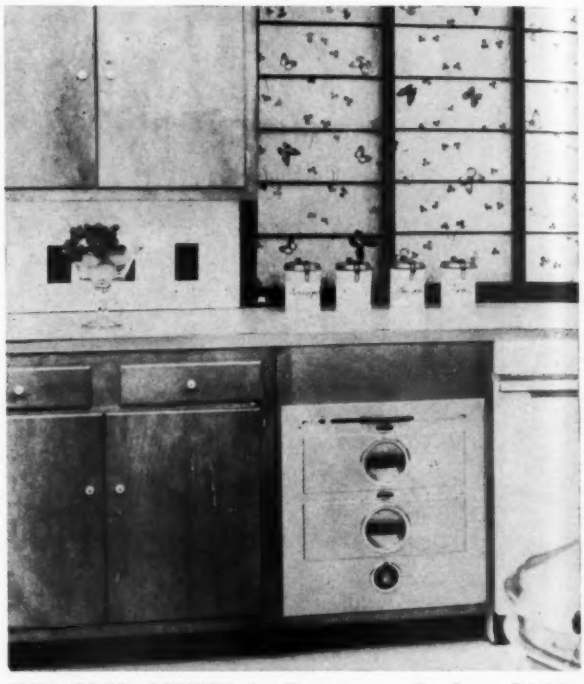
FIRST SHIPMENT of Kelvinator appliances to the world's newest nation is on the high seas bound for Ghana, West Africa. Kelvinator officials C. E. Findlay (left), export engineering and production manager, and E. H. Wilcox, export vice president, apply the new Ghana label to a crated refrigerator, part of the shipment of refrigerators and room air conditioners assembled in the company's Detroit warehouse. Formerly the Gold Coast, a British colony, Ghana became an independent nation recently.

TOP BURNER for gas range has been introduced by Geo. D. Roper Corp. According to company spokesmen, a distinct advantage of the new burner is its "Circle-Simmer" flame. Rather than concentrate the simmer flame in a small area, the new burner spreads it in a circle around the edge of the burner.

APPLIANCE DESIGN questions were answered at a recent meeting of Electrical Women's Round Table (Chicago) by a panel of experts from the appliance industry. Mrs. Florence Beebe Anderson, design coordinator for Norge, is surrounded by (left to right) F. W. Perl, Westinghouse; Maurice Lipsich, Dormeyer Corp.; J. W. Stephens, Frigidaire; O. D. Johnson, Sears Roebuck; Douglas W. Quirk, Hotpoint; and C. A. Cobb, Whirlpool-Seeger.

the MPM . . .

on the theory that one photo equals one thousand . . . ture will bring you many photos and new wo . . .



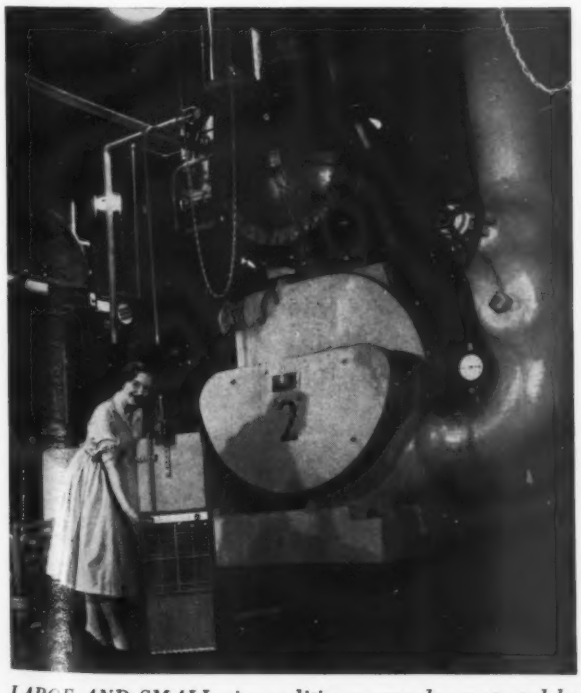
HOT FOOD SERVER by Toastmaster Products Division of McGraw-Edison Co., is a new home appliance designed to keep cooked foods hot and ready-to-serve for hours after they are prepared. Here it is built into a newly-completed Redbook Magazine *multi-unit kitchen. The kitchen is designed as a place to develop and test recipes, appliance uses and homemaking techniques published by the magazine monthly.*

ONE MILLION garbage disposers have been manufactured by Waste King Corporation. Here Sam Given, president, helps George Gray of the packaging department package the gold-plated millionth unit just after it was produced at the firm's Los Angeles plant. Waste King, world's largest manufacturer of disposers, has sold approximately one-third of all disposers produced since 1950.

. . foto-news

**housand words this MPM foto-news fea-
ew words about people and products.**

AMERICAN BEAUTIES associated with Republic Steel are Mrs. Illinois of 1958 and the Republic Steel Kitchen in which she is shown. Mrs. Illinois is Mrs. Virginia Bream of Glenview, Ill., mother of three, part-time fashion model and wife of Robert Bream, a salesman for Republic's Berger Division, the home of Republic Steel Kitchens. Mrs. Bream will compete for the Mrs. America title at Fort Lauderdale, Florida.



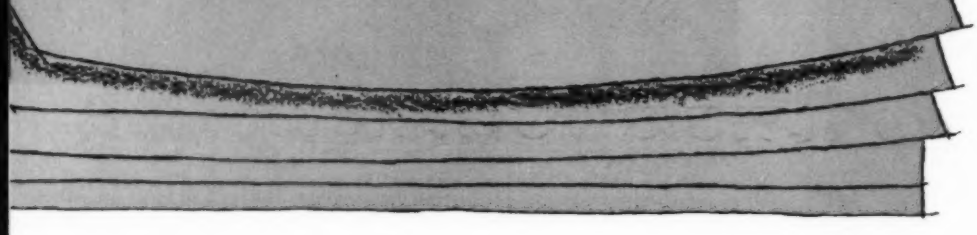
LARGE AND SMALL air conditioners are demonstrated by Laura Conley, hostess for the Carrier Corp. exhibit at the recent Mobile Homes Show in the New York Coliseum. Miss Conley turns the control dial on the tiny 1 HP Roomette air conditioner designed for use in mobile homes. Looming behind her is one of the four Carrier centrifugal refrigeration machines which cool the 9 acres of exhibit space.

FABULOUS FABRICS admirers surround a reclining mannequin who wears a robe by Princeton Knitting Mills, Easy's partner in a "Fabulous Fabrics" promotion. They are Easy Laundry Appliance's executives James G. Koontz, national field sales manager, Parker H. Ericksen, vice president, and Richard E. Weiss, advertising manager. Seated are Helen Kendall, director appliance and home care, Good Housekeeping, *and Edith Ramsay, home equipment editor,* American Home.

COMBINATION OFFER introduced by Landers, Frary & Clark pairs a 10-cup Coffeematic with a matching Universal Automatic Toaster under the name of the "Coffeematic Breakfast Twins". Priced at $39.95, price reduction is nearly $10 from the $49.90 price when bought separately.

VENTILATING ENGINEERS from Germany, the Netherlands and Switzerland visited Rheem-Chicago on a recent tour of the United States. The tour, arranged through Rheem-International by the German Educational Travel Assn. of New York, was to give the European engineers views of warm air heating and air conditioning applications in the U.S. and to show manufacturing processes. The engineers were photographed at the Rheemaire condenser line.

More than 90% of all modern porcelain enameling furnaces are BUILT by FERRO



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UNITED STATES

Allen Mfg. Co.
AllianceWare, Inc., Alliance, Ohio
AllianceWare, Inc., Colton, Calif.
AllianceWare, Inc., Kilgore, Texas
American Kitchens Div. Avco Mfg. Corp.
American-Standard Plumbing & Heating Div.
Apex Electrical Mfg. Co.
Armstrong Products Corp.
Avondale Marine Ways, Inc., Avoncraft Div.
Barridon Oil Burner Corp.
Barrows Porcelain Enamel Co.
Bellevue Porcelain Enameling Co.
Benjamin Electric Mfg. Co.
Bettinger Enamel Corp.
Briggs Mfg. Co.
California Metal Enameling Co.
Carrier Corp.
Cleveland Porcelain Enameling Co.
Conlon-Moore Corp.
Cribben & Sexton Co.
Davidson Enamel Products Co.
Day-Brite Lighting, Inc.
DeKalb Enameling Co.
Erie Enameling Co.
Ferro Enameling Co., Oakland, Cal.
Fletcher Enamel Co.
Florence Stove Co., Kankakee, Ill.
Florence Stove Co., Lewisburg, Tenn.
Fowler Mfg. Co.
Ed. Friedrich, Inc.
Frigidaire Div., General Motors Corp.
Gaffers & Sattler Co.
Geuder, Paeschke & Frey Co.
Gibson Refrigerator Corp., Belding, Mich.
Gibson Refrigerator Corp., Greenville, Mich.
Goodrich Electric Co.
S. D. Hicks & Son Co.
C. V. Hill & Co., Inc.
Houston Porcelain Enameling Co.
Hussman Refrigerator Co.
Independence Stove & Mfg. Co.
Ingram-Richardson, Inc., Frankfort, Indiana
Jones Metal Products Co.
Kelvinator Div., Nash-Kelvinator Corp.
Lawndale Enameling Co.
Lindemann, A. J., & Hoverson Co.
Lisk Mfg. Co.
Maytag Co.
McCray Refrigerator Co.
Midwest Mfg. Corp., Div. Admiral Corp.
Mission Appliance Corp., Hawthorne, Calif.
Mission Appliance Corp., New Albany, Miss.
Mt. Vernon Furnace Mfg. Co.
Mullins Mfg. Corp., Salem, Ohio
Mullins Mfg. Corp., Warren, Ohio
Murray-Eljer Corp.
Murray Mfg. Co.
Newark Stove Co.
Norge Div., Borg-Warner Corp., Effingham, Ill.
Norge Div., Borg-Warner Corp., Herrin, Ill.
Norge Div., Borg-Warner Corp., Muskegon, Mich.
Norris Stamping & Mfg. Co.
Ohio Foundry Co.
O'Keefe & Merritt Co.
Peerless Enamel Products Co.
Perfection Industries
Pfaudler Co., Rochester, N. Y.
Philco Corp.
Pepco Corporation
Porcelain Metals Corp.
Porcelain Steel Corp.
Portland Stove Foundry Co.
Rheem Mfg. Co., Chicago, Ill.
Rheem Mfg. Co., South Gate, Calif.
Rheem Mfg. Co., Sparrows Point, Md.
Roesch Enamel & Mfg. Co.
Geo. D. Roper Corp.
Samuel Stamping & Enameling Co.
Seaporcel Metals, Inc.
Servel, Inc.
Smoot-Holman Co.
Southwestern Porcelain Steel Corp.
Standard Enameling Co., Inc.
Stove Works, Inc.
Tappan Stove Co.
Tennessee Enamel Mfg. Co.
Tennessee Stove Works
Textite, Inc.
A. F. Thompson Mfg. Co., Huntington, W. Va.
A. F. Thompson Mfg. Co., Tyler, Tex.
Toledo Porcelain Enamel Products Co.
Tyler Fixture Corp., Waxahachie, Texas
Tyler Heater Co.
Tyler Refrigeration Corp., Niles, Mich.
United States Porcelain Enamel Co.
U. S. Stamping Co.
Utility Appliance Corp.
Vikon Tile Corp.
Vitreous Steel Products Corp., Nappanee, Ind.
Vitroglass Corp.
Warren Co., Inc.
H. Waterman & Bro. Co.
Welbilt Appliance Corp., Detroit, Mich.
Welbilt Appliance Corp., Maspeth, L. I., N. Y.
Western Stove Co., Culver City, Cal.
Western Stove Co., McGregor, Tex.
Westinghouse Electric Corp., Columbus, Ohio
Westinghouse Electric Corp., Mansfield, Ohio
Westinghouse Electric Corp., Vicksburg, Miss.
Whirlpool-Seeger Corp., Clyde, O.
Whirlpool-Seeger Corp., Evansville, Ind.
Whirlpool-Seeger Corp., Hamilton, Ohio
Whirlpool-Seeger Corp., St. Joseph, Mich.
Whirlpool-Seeger Corp., St. Paul, Minn.
John Wood Mfg. Company
Wrought Iron Range Co.

LATIN AMERICA

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Acros
Brasmotor
C.A.P.E.A.
C.A.T.I.T.A. (Electric)
Cia. Industrial Del Norte
S/A Comercio & Industria Souza Noschese
Companhia Distribuidora Geral Brasmotor
Companhia Geral De Industrias
Corp. Nacional Distribuidora, S. A.
F. Daroch & Cia.
Delgado Hermanos S.A.
Delher
Duresmalt, Metalurgica E Esmaltacao Ltda.
E.M.E.R.A.R.
Enlozados Delta
Esmalterias Argentinas S. A.
Esmaltes Mexicanos S.A.
Establecimientos Metalurgicos Argentinos
Fabrica de Enlozados S. A.
Fabrica de Enlozados Condor S. A.
Fabrica de Enlozados, Fernandez Rivas
Fabrica de Ferro Esmaltado Silex
Fernandez Rivas, S.R.L.
Ferriloza S. A.
Ferrosmalt, S. A.
Ferrosmalte
Fierro Esmaltado, S. A.
Flamex-Talamoni S. A.
Fogoes Junker & Ruh, S. A.
General Electrica S. A.
General Electric Co. (Mexico)
General Motors do Brazil S.A.
Hime S/A—Industria & Comercio
Industria Electrica de Mexico, S.A.
Industrias Mabe S.A.
Industrias Martins Ferreira S.A.
Industria Nacional de Ferro Esmaltado—INFEL—Ltda.
Industrias Reunidas S.A.
Kelvinator Corp. (Mexico)
E. Lucena & Cia.
A. Macchi & Cia.
Manufacturas Corona S.A.
Manufacturera de Metales S.A.
Manufacturera General Electric S.A.
Arthur Martin Argentina S.A.
C. A. Massaglia
Maveroy Ind. Frig. Ltda.
Metalurgica Douat
Pacheco & Co.
Pacheco, Ltda.
Jose Pascucci y Cia.
Luis M. Priori
Privea S.R.L.
Productos Metalicos Esmaltados S.A.
Record S.A.
Rheem Metalurgica S.A.
S.E.A. (Sociedad Esmaltadora Argentina)
Selmar S.A.
Siam Di Tella Ltda.
Sociedade Artema Ltda.
Tabares Castillo & Co.
Talleres Eulalia
Talleres Leon
Terriza & Cia.
Troqueles y Esmaltes S.A.
Tuffano & Co.
Vainer & Co.
Viesa

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Adanac Foundry Industries Limited, Quebec, Canada
AllianceWare Limited
American Standard Products
Beach Foundry Limited
Beatty Bros., Ltd.
A. Belanger, Ltd.
Graham Bell Enamelling, Ltd.
Canadian General Electric Company
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Union Enamel Co., Ltd.
Vitreous Enameling Corporation Pty. Ltd.

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Benjamin Electric Co., Ltd.
Bilston Foundry Ltd.
Birtley Company
Cannon Industries, Ltd.
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Chew & Commander, Ltd.
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Frigidaire, Div. of Gen. Motors, Ltd.
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General Gas Appliances, Ltd.
Grangemouth Iron Co., Ltd.
Richard Haighton Ltd.
Jackson Electric Ltd.
J. A. Jordan & Sons, Ltd.
Jury Holloware, Ltd.
R. & A. Main, Ltd.
Parkinson Stove Co., Ltd.
Pressed Steel Co., Ltd.
Richmonds Gas Stove Co., Ltd.
Royal Ordnance Factory
Rubery Owen & Co., Ltd.
Simplex Electric Co., Ltd.
L. Sterne & Co., Ltd.
Ernest Stevens Ltd.
Stoves Ltd.
Tipton Enamel Co.
Trans-Heat Ltd.
Valor Co., Ltd.
Wallis & Co., Ltd.
Wilson & Mathiesons, Ltd.

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Azurea
Gerard-Becuwe
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Coste-Caumartin
Ditta Guiseppe Moneta S.p.A.
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Elio Baggio
Emaillirwek A. G. Fulda
Ferdinando Zoppas & Figli
Fiar di G. Focherini & C.
Fonderies—Arthur Martin
Fonderies & Ateliers du Rhone
Fonderie & Smalterie Lombarde
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Gasfire S.p.A.
General Motors Corp.—France
Glud & Marstrand's Fabriker A. S.
A. B. Gustavsberg Fabriker
Husqvarna Vapenfabriks
Ind. Mecc. Cav. Gerolamo Grecchi
Isola S. A.
J. Kaliba & Sohn
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Metallwarenfabrik Maybaum
N. V. Emailleerfabriek "Ferro"
N. V. Ijzergieterijen en Emailleerfabrieken "De Etna"
O.S.V.A.
P. D. Phillis & Sons
Procedes Sauter
S.A.R.E.B.
S.I.L.T.A.L.
S.N.A.E.
S.N.C.A.S.O.
Saint-Maurice
Siemens Schmucker
Siemens-Schuckertwerke A. G.
Smalteria Emiliane
Smalterie Lombarde Ing. A. Riva, Lecco, Italy
Smalterie Lombarde Ing. A. Riva, Milan, Italy
Smalterie Meridionali
Smalterie Marocchi
Smalterie Travalin
Societe Generale d'Appareillage Electrique
Thermor
Usines & Fonderies Nestor Martin S. A.
Usines Surdiac S. A.
Zanussi

AUSTRALASIA

A.P.E.M. Company
Aust. Electrical Industries
John C. W. Bridge & Co. Pty., Ltd.
British General Electric Co.
W. T. Carmichael Limited
Charles Hope Limited
Chown Bros. Pty., Ltd.
Claude Neon (Aust.) Ltd.
Commonwealth Aircraft Corp.
Electricity Meter Mfg. Co., Ltd.
E. S. & F. Ferrier
General Motors-Holden's Ltd., Melbourne, Aust.
General Motors-Holden's Ltd., Sydney, Aust.
General Motors-Holden's Ltd., Wellington, N.Z.
Hallstrom's Pty., Ltd.
Alexander Harvey & Son Pty., Ltd.
A. C. Healing
Harris Hutchinson Pty., Ltd.
Inter-Island Gas Service, Inc. (Manilla, P.I.)
J. & A. P. Scott Ltd.
Kelvinator (Aust.), Ltd.
Malleys Limited
McIlwraith Ind. Pty., Ltd.
Metters K.F.B., Ltd., Adelaide, Aust.
Metters K.F.B., Ltd., Sydney, Aust.
Parkinson Stove Co. (Aust.), Ltd.
Pioneer Springs Pty., Ltd.
Pope Products Ltd.
Porcelain Enameling Ind. Pty., Ltd.
President Industries Pty., Ltd.
Radcoates & Co., Pty. Ltd.
Radiation (N.Z.), Ltd.
St. George Ranges
Scott Bros. Pty., Ltd.
H. E. Shacklock Ltd.
A. Simpson & Son Pty., Ltd.
Specialised Engineering Prod., Ltd.
United Metal Ind. Pty., Ltd.
Vitro Holloware Co.

OTHER COUNTRIES

Cairo Metal Products, Egypt
Delta Trading Company, Egypt
Erani, India
Godrej & Boyce Mfg. Co., Ltd., India
Hammond Lane Ironfounders Ltd., Eire
Hyderabad Allwyn Metals, India
Kalinga Refrigerators Corp., Ltd., India
Macneill & Barry, Ltd.
Palalum Ltd., Israel
Strafor-Maroc, French Morocco
Tanaret Enamelling Fact. Ltd., Israel
Thai Rice Company, Ltd., Thailand
Turk Demir Dokum Fabrikalari

**In the Porcelain enameling field ONLY...and for whom furnaces (box, continuous, straight-through—gas, oil, electric) or complete plants have been or are being built.*

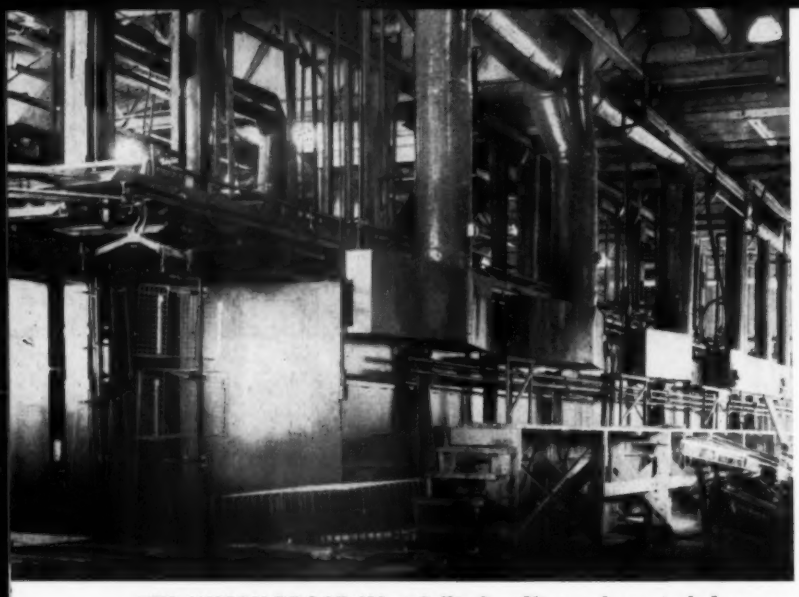
let the leaders be your guide!

Whether you need a new furnace . . . or a new plant . . . or simply the modernizing of your present facilities, Ferro's Engineering Division can handle the job competently and put you on the road to bigger profits from your Porcelain enameling operations.

Ferro installations are engineered to fit specific production and fuel requirements, and to give you the close control of temperatures so essential to profitable production and quality products. So play safe—do as the industry leaders do—come to Ferro for Porcelain enameling engineering.

1150 East 56th Street, Cleveland 5, Ohio

MPM foto-news about INDUSTRY SUPPLIERS

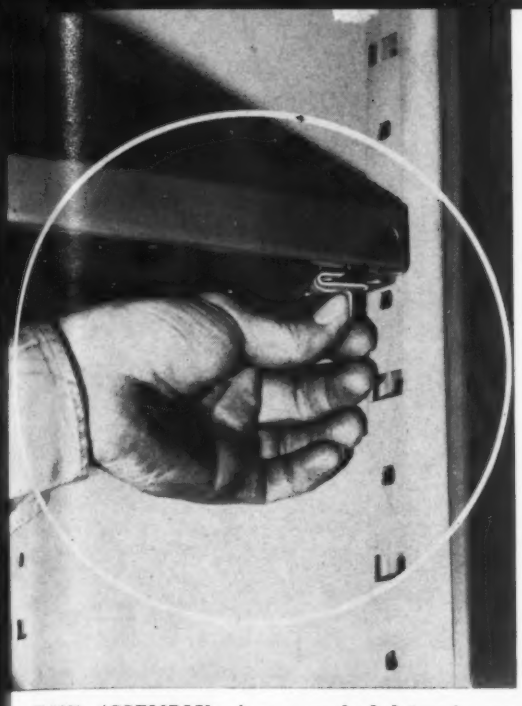


EXPANSION PROGRAM at Collis Co., Clinton, Iowa, includes a new plating setup for copper, nickel, and chromium. The new automatic equipment relieves high finishing costs resulting from batch plating methods. Two additional systems, one for zinc plating and the other for organic finishing, in colors and clears, round out the installation. Each conveyor requires only two operators.

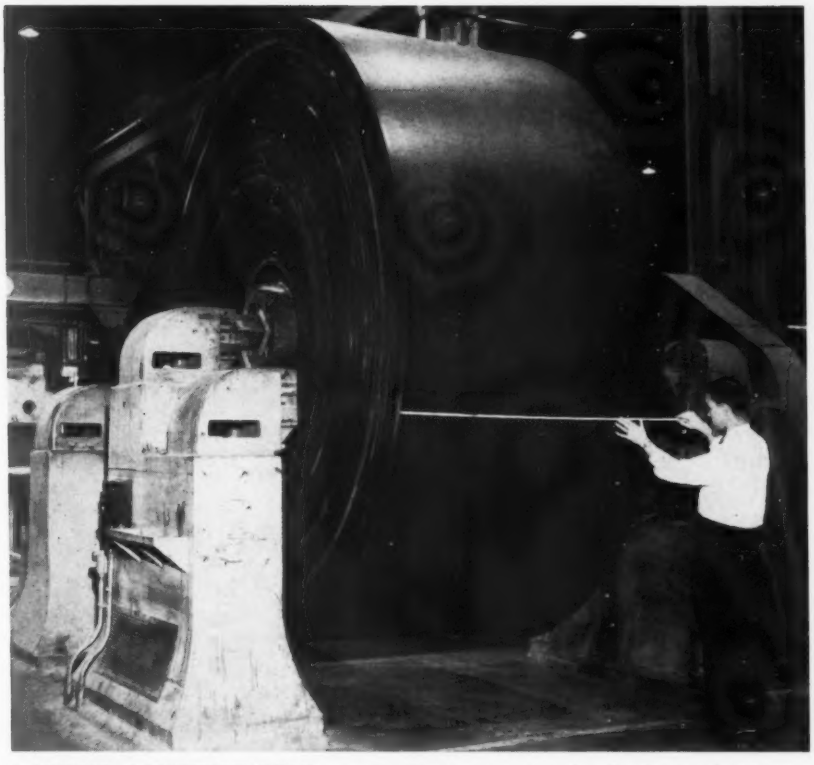
COMPRESSORS, moving along conveyor lines at Kelvinator's Detroit plant, are checked by Charles H. Herrlich, sales manager of the commercial contract department, and T. J. (Johnny) Ammel, assistant sales manager. The new "Space-Saver" compressor models are now available in quantity to manufacturers of refrigeration products, Herrlich said. The models, in nominal one-fifth and one-eighth horsepower, occupy a minimum of space, and can be mounted in a variety of applications. ←

THIS POWER TOOL is the versatile multi-purpose "ShopSmith" of the Magna Power Tool Corp., Berkeley, Calif. "Electricweld" tubing, made by Jones & Laughlin Steel Corp., is used for numerous purposes in the construction of the multi-purpose do-it-yourself tool.

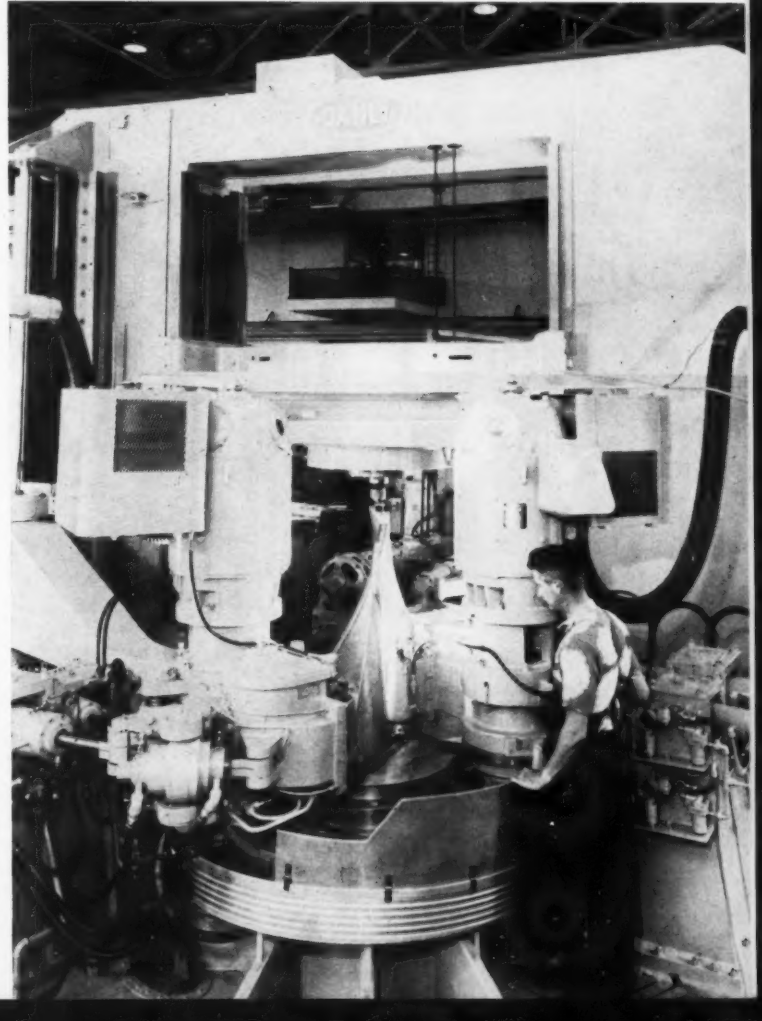
SAFETY CHART, showing all-time low accident rate for Worcester Pressed Steel, is examined by President Carter C. Higgins and members of company Safety committee. The legend above the chart is the company's safety slogan. From l. to r. are Safety committee Chairman Benjamin M. Pacek, Higgins, and Richard J. McCarthy, committee member. ←



EASY ASSEMBLY of new steel shelving is provided by a shelf support with built-in pivoted locking device (circle) which holds shelves solidly in place. The shelf is supported on each side by this removable shelf support which extends the full depth of the shelving frame. These supports are quickly slotted into rectangular holes located on 3-inch centers along the vertical support posts.



LARGEST CONVEYOR BELT ever made in one piece by B. F. Goodrich Industrial Products Co., Akron, O. The one-piece belt, which is over 1,000 feet long and 60 inches wide, will carry iron ore as part of Orinoco Mining Company (U.S.S. subsidiary) iron ore handling operations at Puerto Ordaz, Venezuela. The belt weighs 22½ tons, and the roll stands 13 feet high.



AIRFOIL MILLING MACHINE (150 ton), capable of sculpturing in metal the complex shape of an airplane's wing, or the twisted blades of an axial flow air compressor, is now in use by the NACA's Ames Aeronautical Laboratory at Moffet Field, Calif., in its work of scientific research in aeronautics. The unique machine tool is the only one of its kind in existence, and was developed and built to the requirements of the Federal Government research center. This closeup photo of the Danly airfoil milling machine shows two milling cutters in action on an airfoil shape. To the rear of the workpiece may be seen the wooden pattern which is made to scale — four times the size of the workpiece.

THE MPM spotlight

Combination 12 cu. ft. refrigerator-freezer is one of two two-door models offered by the Hotpoint Co. This model features automatic defrosting, aluminum door shelves for storage of butter, cheese, eggs, and bottles, tall bottle storage zone, etc. Featured also are aluminum glide-out shelves for easy storing and removing of foods, plus twin porcelain enameled vegetable crispers.

Tongue support part for New Holland baler, prepared with 75-ton Warco inclinable punch press, is shown fitted in place on Hayliner 68 assembly line at New Holland, Pa. Inspecting the job is Sub-assembly Foreman Lee. Larkin.

"Warco PRESSES ...Stand up!"

"Not a breakdown in five years," says leading farm machine manufacturer

• Several years ago New Holland Machine Company, New Holland, Pa., purchased their first Warco Press . . . an inclinable punch press. It is still working as good as the day they bought it. Since then they have added other Warcos for piercing, blanking and forming a variety of machine parts. "We find these presses very satisfactory," say New Holland officials; "in our five years of using Warcos we have never had a breakdown."

Warco Presses stand up because they are built from the frame out to deliver maximum performance in the most difficult assignments.

Using a 75-ton Warco inclinable punch press, operator Christian Good turns out tongue support parts. Watching the operation is Assistant Foreman Lester Howe. Ten-gauge hot-rolled sheet steel is used for the part.

THE FINISHED PRODUCT... Warco inclinable punch press had a hand in turning out this smart-looking, smooth-performing Hayliner 86 baler. The machine was designed to bring the average-size farm big baling capacity at smaller baler cost.

Federal® WELDERS

The Federal Machine and Welder Company

WARREN, OHIO

Warco PRESSES®

Group meeting of Room Air Conditioner Section of ARI *held Monday, May 6 at Hot Springs, Va.*

Stephen Blake photo for MPM

ARI fourth annual meeting

standards, merchandising organization, and defense mobilization were lead subjects for air conditioner and refrigerator manufacturers at Hot Springs meeting

by Dana Chase • EDITOR

THE fourth annual meeting of the Air Conditioning & Refrigeration Institute was held at The Homestead, Hot Springs, Virginia, May 5 through May 8. Many of the members interviewed declared this year's meeting to be the most successful held to date. In addition to the usual fine service and atmosphere of The Homestead, those attending the convention were favored by the weatherman with perfect weather for golf, swimming, and other recreational activities.

Twelve individual sections of ARI held meetings during the four-day convention, with the annual meeting and general session scheduled for Tuesday, May 7. Individual meetings were held by the following sections: Air-Conditioning and Refrigeration Systems; Flow Control Valves; Refrigerants, Lubricating Oils and Chemicals; Room Air-Conditioner; Small Compressor; Tubular Products; Heat Transfer; Temperature Controls; Valves, Driers, Fittings and Accessories; and the Government Relations and Exposition Committees.

Lud Emde heads new slate

Lud Emde, president of Temprite Products Corp., Birmingham, Mich., was elected president of ARI at the annual meeting on Tuesday. Don B. Petrone, president of Typhoon Air Conditioning Co., Inc., (Division of Hupp Corp.), was elected vice president. Rudy Berg, vice president of Copeland Refrigeration Corp., was elected treasurer.

The three newly-elected officers, together with M. M. Lawler, vice president of Worthington Corp. and retiring president of ARI, and managing director George S. Jones, Jr. make up the organization's executive committee for the coming year.

Trade Association cooperation

Retiring president Lawler, in his report to the meeting, reviewed the complicated problems facing the air-conditioning industry. He stated an interesting point of policy for the Air-Conditioning & Refrigeration Institute. He said that there are several trade associations which have allied and in some cases slightly over-lapping interests in the field. It is the policy of ARI that there should be no competition between these associations and that the best thinking and work of individuals within the institute should be for the best interests of the *industry*, regardless of the specific interests of ARI.

George S. Jones, Jr., managing director, stated that standards and user recognition are uppermost in the minds of the industry. He pointed out that within the structure of ARI, 158 different meetings (joint, committee, etc.) are held in a single year to work out the problems affecting the various industry sections. Mr. Jones reported that it was expected that not later than the end of May 1957, approximately 100 per cent of the air-conditioning industry will be testing according to ARI recommendations and standards.

The managing director also referred to the by-annual exposition which is scheduled for Chicago later this year. He reported that an industry advisory committee meeting with the Govern-

MPM photos

J. Lewis Powell, speaker, "The Collapse of Time"

Henry Bund, speaker, "New Marketing Concept"

H. G. Strong, RISAC *"The Importance of Safety"*

George S. Jones, managing director

Distinguished service award from past president James Emmett, Jr. (right) to M. M. Lawler, retiring president.

MPM photos

Lud Emde, president elect

ment had an attendance of 400. This joint Government and industry activity is expected to continue.

Jones said that a booklet on air conditioning is available, and that a new film on air conditioning is designed to sell the idea of air conditioning instead of a specific industry product.

Another important development has been the drafting of a municipal safety ordnance which has been developed with RISAC (Refrigeration Industry Safety Advisory Committee). It will be made available to communities that have decided to prepare an ordnance on safety, Jones stated.

Service award to Lawler

A distinguished service award was presented to retiring president M. M. Lawler for service to the industry during his term as president. The presentation was made by past president James Emmett, Jr. of the James P. Marsh Corp.

In accepting the presidency of ARI, Mr. Emde reiterated the institute's policy of cooperation with other trade associations and expressed the organization's desire to work with the other groups to eliminate duplicated effort.

The collapse of time

The first of two extremely interesting general session speakers was J. Lewis Powell, program administrator of the Office of Assistant Secretary of Defense. In Mr. Powell's presentation, "The collapse of time", he graphically portrayed the vast difference in conditions today and the rate of progress when compared to earlier years, with its relationship to industry's part in a preparedness program. As he pointed out, we are apparently making more progress in "speed, explosives, etc." in a single year than was formerly made in a century.

Mr. Powell's principal responsibility is monitoring the Production Allocation Program under which the Army, Navy, and Air Force plan with industry for the production of military items in the event of war. This program makes it possible for manufacturers to know how much of what and for whom to produce in case of war. Currently, approximately 23,000 firms are participating in the program. They are listed with the Department of Defense in the Register of Planned Mobilization Producers.

If you are interested in your firm participating take the following steps. Determine if your firm has the potential to produce significant quantities of a hard-to-get, hard-to-make military item. The item must be necessary for survival and retaliation, maintenance of health or combat efficiency. In addition the military item must involve a production problem. Next determine the particular military commands which have planning responsibility for the essential military items your firm could produce. A firm that doesn't know which military offices to contact can get help by purchasing "U. S. Government Purchasing Directory" from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. for a cost of 50¢. Knowing what it can produce and who buys it, it is then up to the firm wishing to participate to demonstrate its wartime production potential to the point where a military planning office decides to register the firm as a potential wartime producer.

The new marketing concept

Under a subject heading "How marketing can increase your profits", Henry Bund, vice president of Research Institute of America, told the producers of air-conditioning and refrigeration equipment that he felt the nature of their products placed them in an excellent position for a handsome gain which could result from the study and use of the newest concepts of marketing and marketing organizations.

Mr. Bund clearly interpreted marketing to include *all* of the functions between production and the final buyer.

"Re-structuring of corporate organizations is in a substantial majority of cases involving an expansion of personnel within the marketing function or is designed to give the marketing function greater eminence within the corporate structure," Mr. Bund stated. "Or it may be aimed at providing closer integration

to Page 66 →

MPM photo

Meeting of Self Contained and Residential Air Conditioner Section on May 8.

Western air conditioning conference and show

by Gilbert C. Close • WESTERN EDITOR

MEMBERS of the newly-formed Western Air Conditioning Industries Association staged their first big show in the Shrine Exposition Hall, Los Angeles, running May 4th through May 8th.

Called the First Western Air Conditioning, Heating, Ventilating and Refrigeration Conference and Exhibit, the show dates paralleled a regional meeting of the American Society of Heating and Air Conditioning Engineers in progress at a nearby hotel.

Though this was the first show sponsored by the newly-formed organization, there was nothing "amateurish" in its presentation. More than 100 well-planned industrial exhibits were on display. Though admission was "by invitation only", and registration was required, nearly 10,000 guests viewed the exhibits.

The show was sparked to life by an important conference held early on opening day (May 4). This was an analytical symposium on School Air Conditioning. Frank Neal, Western Director of the School Division of Minneapolis-Honeywell, was moderator. Speakers included E. B. Hilton, chief engineer of C. W. Walz, Consulting Engineer; W. L. Donley, consulting engineer; Dale Briggs, Western manager of Herman Nelson division of the American Air Filter Co.; John Leemhuis, vice president of Airfloor Co.; and Milton Wilson, general manager of Anemostat Corp.

School systems discussed included a system using a central boiler and refrigeration plant, floor panel distribution systems, individual unit ventilators in each classroom, and high velocity systems.

Harry Seese, sales engineer for Russel Sales Co., demonstrates a glass model of a typical refrigeration system, designed so that even a neophyte can see at a glance "how it works." System was loaned by Ansul Chemical Co.

Small section of the exhibit floor at the Air Conditioning show. MPM PHOTO

Another session, held early on May 7th, was devoted to discussing operational troubles in various systems which required the services of an engineer to diagnose and correct. Slides of a number of refrigerating and accessory installations were shown to point up the talks.

Technical sessions held by the concurrently-meeting American Society of Heating and Air Conditioning Engineers (and open to all) included "Calculations Investigating the Applications of Air Conditioning to a School;" "Control of Air Borne Sound Transmission;" "An Investigation of Filter Systems for Removing Irritants from Polluted Air;" "Air Conditioning of Existing Buildings;" "High Velocity Air Systems;" "Individual Chilled Water Units;" "Individual Package Units;" "Weathermaster Systems;" and "Conventional Air Duct Systems."

Arthur J. Hess, president of the Western Air Conditioning Industries Association, was delighted with the show and the attendance.

Suffice it to say, this first show sponsored by WACIA was a show from which you could take home a huge amount of worthwhile information and advice.

A photo story of the AHLMA convention

A PRESSTIME STORY covering the principal features of the American Home Laundry Manufacturers' Association convention was carried in the May issue of MPM.

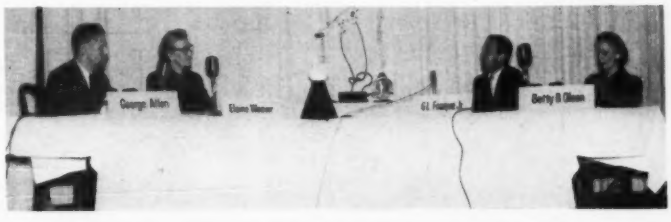
In presenting the on-the-spot story of the forty-first annual AHLMA meeting, it was announced that photographic coverage of the meeting would appear in this, the June, issue of MPM.

The following three pages carry a photographic "cross section" of the membership — active, associate, and honorary—as represented at the meeting.

All photographs are exclusive MPM photos.

Turn the page for spread of candid photos from the AHLMA meeting.

B. J. Hank, AHLMA president, awards certificates of Life Membership to (above) C. G. Frantz, formerly of Apex Electric, and J. A. Kyle, retired, Frigidaire Div., General Motors Corp.



Above: "Imagineering Washing Products — 1965" is discussed by a panel composed of (from left) George Allen, Whirlpool; Elaine Weaver, Ohio State university; G. L. Fosque, Jr., E. I. DuPont; and Betty Olson, General Electric.

Four sections of speakers' table at AHLMA luncheon.

Exclusive MPM candid photographs from the

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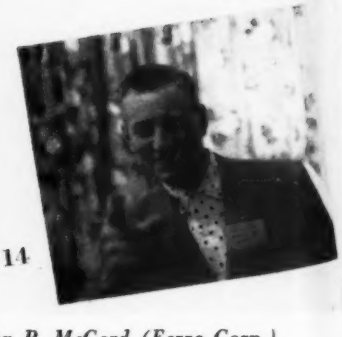

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1 — Mr. & Mrs. J. H. Ingersoll and Mr. & Mrs. R. A. Anderson (Ingersoll Products). 2 — John R. McCord (Ferro Corp.) and Richard Myers (Lovell). 3 — Mrs. & Mr. W. L. Jeffrey and H. L. Travis (Kelvinator). 4 — T. J. Egan (Emerson Electric), Harry C. Kunkelman (Bliss & Laughlin, Inc.), and Carl C. Daily (Firestone). 5 — Fred Maytag II. 6 — Pierce Sperry (Sperry Rubber & Plastics Co.). 7 — R. H. Smith (Blackstone Corp.). 8 — R. A. Lawson (Monarch Aluminum). 9 — S. M. Vance (General Electric). 10 — Mrs. Madeline K. Tuttle (H. W. Tuttle Co.). 11 — Mr. & Mrs. Tom Armel (Glidden Co.). 12 — Mr. & Mrs. W. H. Bowden (Allianceware, Inc.). 13 — Mr. & Mrs. H. B. Miller (General Electric). 14 — Claire G. Ely (Maytag).

the 41st annual AHLMA convention

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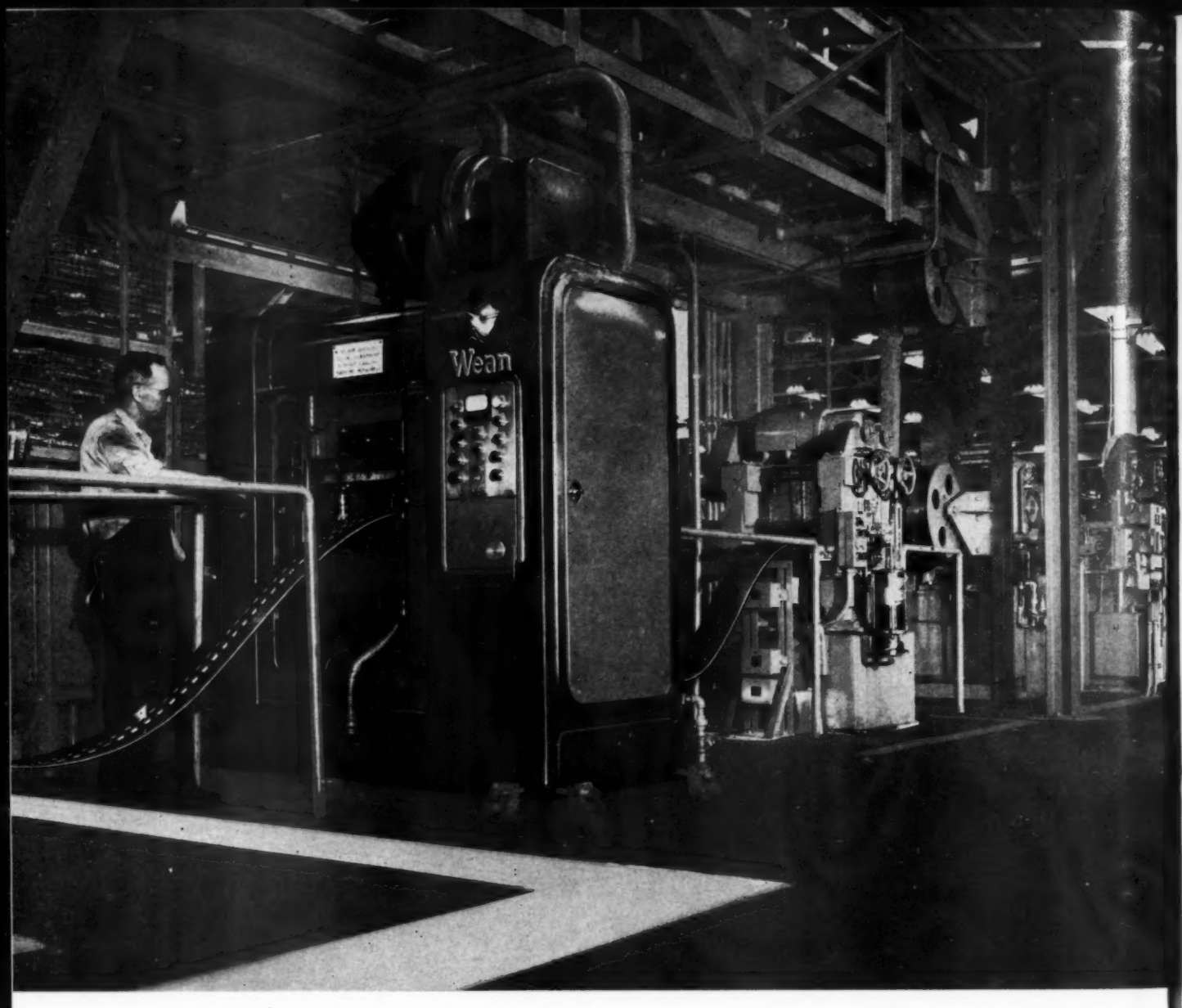
15 — *Juel M. Ranum, Marcia Mead, and Mr. & Mrs. Jack Sparks (Whirlpool).* 16 — *Mr. & Mrs. James Weaver (Ohio State university).* 17 — *Mr. & Mrs. Arthur Franzen (Whirlpool).* 18 — *Mr. & Mrs. Don J. Stockburger (Meyercord Co.).* 19 — *Mrs. W. B. Nixon, wife of W. B. Nixon (Armco Steel).* 20 — *Roy A. Bradt (Maytag).* 21 — *John R. Willard (Alcoa).* 22 — *Mrs. Arnold Ver Lee, wife of Arnold Ver Lee (Easy Washing Machine Div., Murray Corp.)* 23 — *J. Dan Delanty (La Salle Steel).* 24 — *Ted E. Snyder (O. Hommel).* 25 — *Henry Gibson (Lux Clock), Mrs. Don R. Goetchius, Mrs. Gibson, and Mr. Goetchius (Ferro Corp.).* 26 — *Mr. & Mrs. W. R. Gowdy (Procter & Gamble).* 27 — *Mrs. Pierce Sperry and Mrs. R. A. Lawson.* 28 — *Mr. & Mrs. W. R. Hall (International GE).* (more photos on page 41)



The Wean "Flying Press"

continuous strip feed eliminates stop-and-go operation in production lines

In many production lines utilizing conventional presses, the production rate of the entire line is governed by the speed of the press. Thus, though the balance of the line may have a higher production potential, actual production is curtailed by the old-fashioned stop-and-go action of the press. In the case of the Wean "Flying Press", however, the combination of a continuous feed principle plus speeds many times in excess of conventional press rates enables a production line to produce at maximum capacity.

High speed, automated and semi-automatic operations in particular benefit from the many revolutionary advantages inherent in the Wean "Flying Press".

Built in feed rolls — press feed, can be varied while press is running — all controls centralized .... these are but a few of the many features of the Wean "Flying Press". We could discuss simple floor mountings, ultra-high speed operation and many other advantages. However, you can get the complete story by writing today for your copy of the Wean "Flying Press" brochure.

Wean Equipment Corporation
CLEVELAND 17, OHIO

Electric space heating makes its bid

the author presents one side of a picture that is getting the close attention of key people throughout the home heating industry — all fuels

by Stuart L. Forsyth • *MANAGER, WESTINGHOUSE ELECTRIC CORP'S ELECTRIC HEATING FOR HOMES DEPARTMENT*

EVER since the beginning of Man, it has been his lot to be more concerned with providing comfortable living quarters during the cold weather than he has in providing comfortable living quarters during the warm weather. Through the ages he has struggled for a better way to heat. To bring us up-to-date, this struggle to keep comfortable during cold weather records the use of wood, coal, oil, gas and now electricity. Let's not forget that as Man developed the use of each fuel, there was a cost differential to reckon with. The cost of each new fuel alone was usually greater than the previous fuel that was popular. In spite of Man's continuous efforts in this direction, most American homes and places where people work are still uncomfortable in the winter months. The places where they either live or work are either too hot or too cold, too drafty, or there are cold walls and cold floors.

Electric resistance heating not new

Electric resistance heating is not new. Actually, it is just about as old as electricity itself. Earlier acceptance of complete heating by electrical energy was delayed due to fear of the unknown, the unfamiliar, and people's inability to visualize a heat producing device unless it was associated with a flame or fire. But, people are beginning to get serious about living better electrically.

They are beginning to ask the question: Where is there anything better? Heating by electricity is a better way, and people have always found it economically practical to choose and develop the better way. Also, we must remember that there were days when there were efforts made to prove that you could afford to heat with gas or oil, and there were very active campaigns that attempted to prove that electric food refrigeration and cooking was too expensive.

If only the cost of electricity as a fuel is considered, you couldn't sell electric heat. But enough people have become sold upon the advantages that it offers until we are getting very near the one half million mark of completely electrically heated homes in the United States. Why is this happening? I'll tell you one reason now, and others will follow. Going from oil or gas as a fuel to electricity as a fuel for heating is less of a step to make than the step that existed when people began to step up from other fuels to gas.

I certainly don't mean to give you the impression that electric space heat-

ELCO SCREWS

Elco Screws are Good Screws

. . . Ask a man who has used them

REMEMBER ELCO

PHILLIPS SCREWS

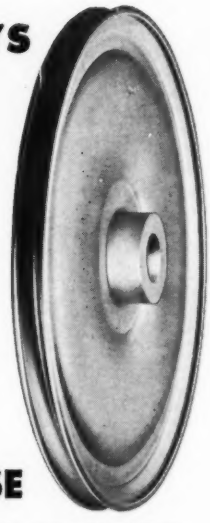
ELCO is one of the prominent sources for all types of "Phillips" Recessed-Head Screws. At ELCO particular care is taken to maintain the standardized specifications of the distinctive Phillips recess — for best performance and lowest handling cost on *your* assembly line. Many ELCO-PHILLIPS Screws are stocked for immediate delivery. *Write for our stock list.*

WOOD SCREWS
MACHINE SCREWS
MACHINE SCREW NUTS
TAPPING SCREWS
THREAD-CUTTING SCREWS
PHILLIPS AND SEMS SCREWS
PIPE PLUGS
STOVE BOLTS
CAP SCREWS
LAG SCREWS
DRIVE SCREWS
SPECIAL SCREWS
COLD HEADED PRODUCTS

ELCO TOOL AND SCREW CORPORATION
1960 BROADWAY • ROCKFORD, ILLINOIS

V-BELT PULLEYS

Lighter
Stronger
Less Costly



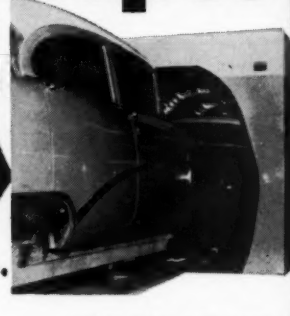
by **NAGEL-CHASE**

If your appliance incorporates a V-Belt, consult Nagel-Chase about pulleys. They're light weight, welded construction, come in sizes to 14", and are ideal for automatic washers, refrigerators, dryers, air conditioners and similar appliances.

You may be able to cut production costs — write today for complete information.

The NAGEL-CHASE MANUFACTURING CO.
2817 North Ashland Avenue, Chicago 13, Ill.
Manufacturers of Nagel-Chase Casters and V-Belt Pulleys

leading auto manufacturers install clepco QUARTZ OVENS



Here's Why...

CLEPCO Quartz Paint Ovens are based on the use of special CLEPCO Quartz Heaters designed to emit that part of the heat spectrum most readily absorbed by paints.

Another major auto manufacturer reports that CLEPCO Paint Ovens are lower in original cost as well as in operating costs than the conventional gas fired convection ovens previously in use.

CLEPCO'S Complete Research Facilities are at your service to determine the most efficient quartz oven for your requirements.

SEND FOR COMPLETE INFORMATION

THE CLEVELAND PROCESS COMPANY
1965 EAST 57TH STREET • CLEVELAND 3, OHIO

CLEPCO

ing has been easy to sell — not at all. This is my 21st year in the electric space heating field, and I will tell you that we have had to sell every step of the way. There were many times when those people who have pioneered in the electric heating field have made a sale only after they have sold: the user, the contractor, the dealer, the wholesaler, the architect, the builder and the utility. Sometimes it was necessary to even sell the friends and relatives of the prospective user.

Many a brave soul has successfully run this course to the point of ultimate sale. But this sale was finally killed by the simple meaningless statement: "Oh, You can't use electricity for heating, it's too expensive". Here is where the utilities and power suppliers can help. They should combat this impression by furnishing accurate facts on anticipated operating costs, and let the customer determine for himself if he considers it too expensive.

You've got to sell effect!

Another factor that the industry is struggling with is: that electric space heating is difficult to glamourize. In many installations the only visible evidence of a heating system is the wall thermostat. It is something similar to selling an intangible. It is something that cannot be parked in front of the house or displayed like a new TV Set or refrigerator to friends and relatives. The same appeal to the pride of ownership that exists in the purchase of a new car just simply does not exist when you are selling heating for comfort purposes. When one stops to consider the contribution a modern heating system makes towards comfortable living, it surprises us that an unbalanced situation like this exists. Again, it is here that utilities and power suppliers can help.

Resistance heating most practical

The types of electric heating devices that are most popular and widely used today employ the resistance method for producing heat. Our immediate opportunities in the electric space heating field is in equipment utilizing the resistance method. For developing a broad market and building a profitable load, this type is the most practical today.

Increasing use of electric heating has been due to a number of factors.

First, manufacturers have created new and improved equipment, and heaters are available for almost every conceivable application. Twenty years ago there were approximately five principle manufacturers of electric space heating equipment. Today there are little over 100 manufacturers of one or more types of electric space heating equipment.

Secondly, more intelligent promotion by manufacturers, distributors, contractors and utilities has been a great booster, as has the increasingly more favorable attitude towards electric space heating that has developed in the utility industry.

Organize NEMA section

A little over two years ago, manufacturers of electric space heating equipment organized a Section under NEMA to agressively and properly promote electric space heating. This is one example of the growing recognition of the many advantages of electric space heating, and that it is no longer a dubious experiment. Increased use has also come with the growth in understanding that extra insulation in the home provides year around comfort, actually pays for itself, and makes electric heat practical from a cost standpoint. A fully insulated home enables electric heating to become competitive with other fuel costs and fit more pocketbooks. The increasing costs of competing fuels has broadened the market. During the past ten years many other fuels have jumped over 200% in costs, while the cost of electricity has remained substantially unchanged. This, coupled with the "Adequate Wiring" campaigns and "Live Better Electrically" campaigns that are now spreading over the land, is helping to increase the use of electric heating, as well as other heavy duty appliances.

Many types now available

There are many types of electric space heating available today. Each particular type has its advantages, depending upon the job to be done and personal preferences. Electric heaters selected to meet a need should receive careful consideration. Disappointments can be avoided by selecting equipment for its quality and safety features, and not simply because it is cheaper. The various types of heaters manufactured today may be placed in two general classifications, convection, and radiant heating.

Today we have wall mounted radiant heating panels. There are wall mounted convectors in natural and fan forced types; there are baseboard systems that fall within the radiant and/or natural convection classifications, and there are radiant heating systems using resistance wire embedded in plastered ceiling or prefabricated panels for ceiling installations. Many types are available for use as unit heaters suspended from walls or ceilings and portable units to meet

to Page 92 →

HOME HEATING from electric baseboard units, fitted snugly and unobstrusively into the walls, is a practical development. The two-foot-long heater sections shown have controls for individual room-by-room regulation.

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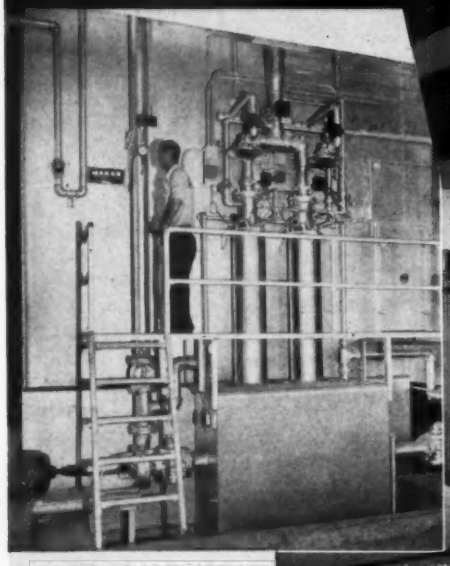
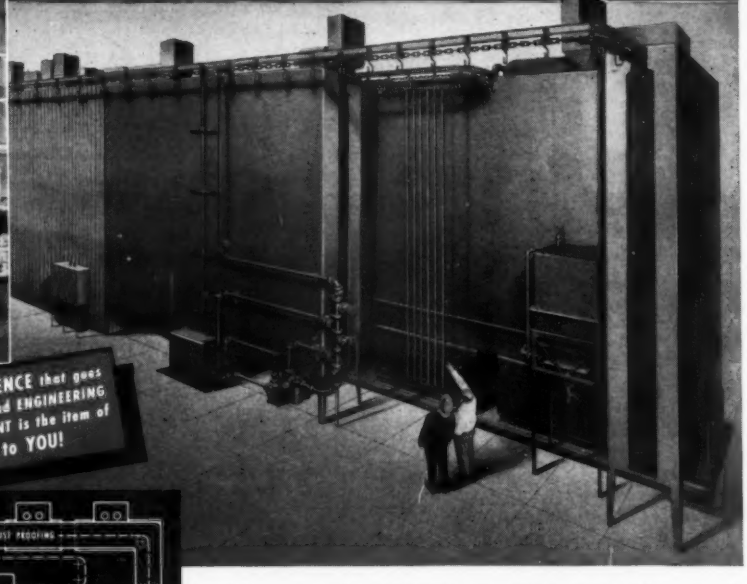


Mahon FIRE-JET Heating Units on the solution tanks of Mahon Five-Stage Metal Cleaning and Rust Proofing Machine—part of the Complete Mahon Finishing System at MULT-A-FRAME Division of Ainsworth Manufacturing Corporation, Detroit, Mich.



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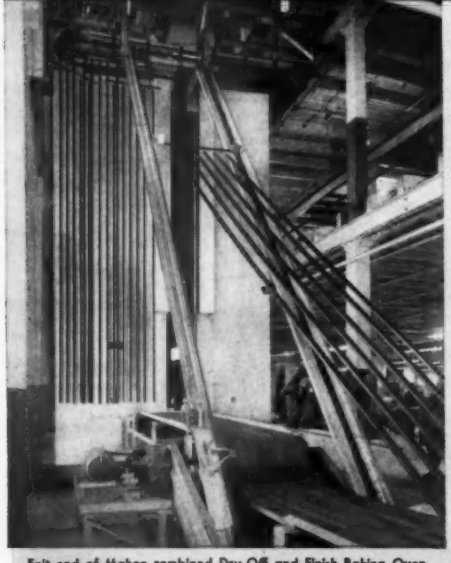

Exit end of Mahon combined Dry-Off and Finish Baking Oven showing Automatic Unloading Conveyor Ramp and Belt Type Handling Conveyors on the first floor at the Ainsworth Plant.

Ainsworth MULT-A-FRAME Channels are Painted in MAHON EQUIPMENT!

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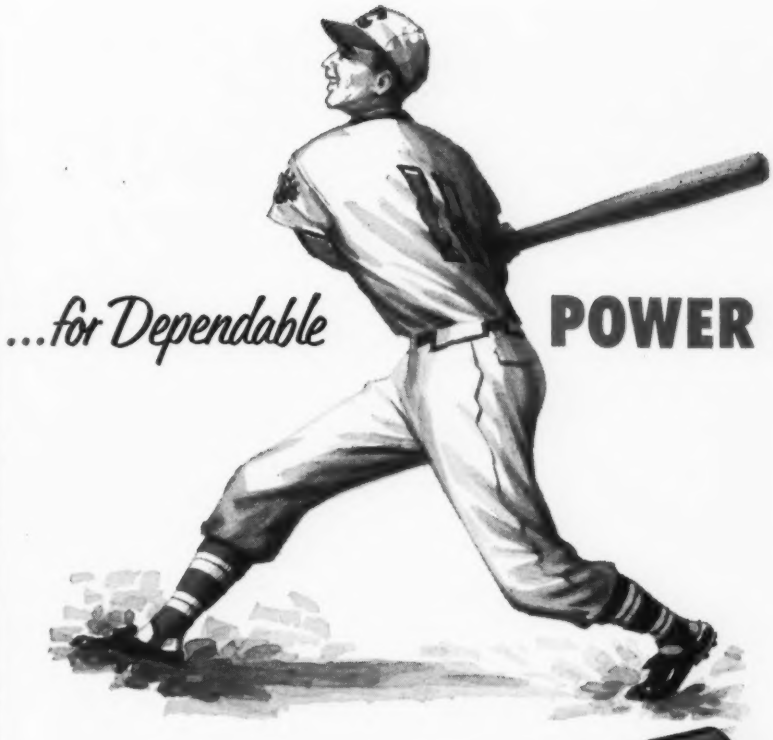
MAHON

More MPM candid photos from the AHLMA meeting

→ from Page 35

1—Mrs. J. R. Lakin. 2—J. R. Lakin (Delco). 3—Mr. & Mrs. Howard Ellerhorst, Jr. (Interchemical) and O. L. Earl (Acme Aluminum). 4—Mrs. & Mr. S. E. Flenner (Ingersoll Products). 5—Mrs. & Mr. Richard Powell (Whirlpool). 6—Mr. & Mrs. Jasper F. Burt (Whirlpool). 7—Mrs. & Mr. Richard S. Rice (Whirlpool).



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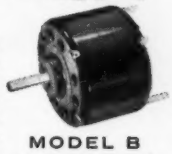
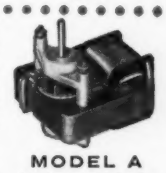
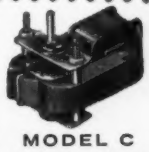


MODEL B
4-pole, 4-coil shaded pole AC Induction Type



MODEL A
2-pole, shaded pole AC Induction Type

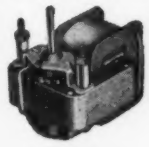


MODEL C
2-pole, shaded pole AC Induction Type

MODEL E
4-pole, shaded pole AC Induction Type

MODEL D
4-pole, 4-coil shaded pole AC Induction Type

MODEL O
2-pole Capacitor Reversible Type AC only (for 6, 12, or 24 volts)



MODEL F
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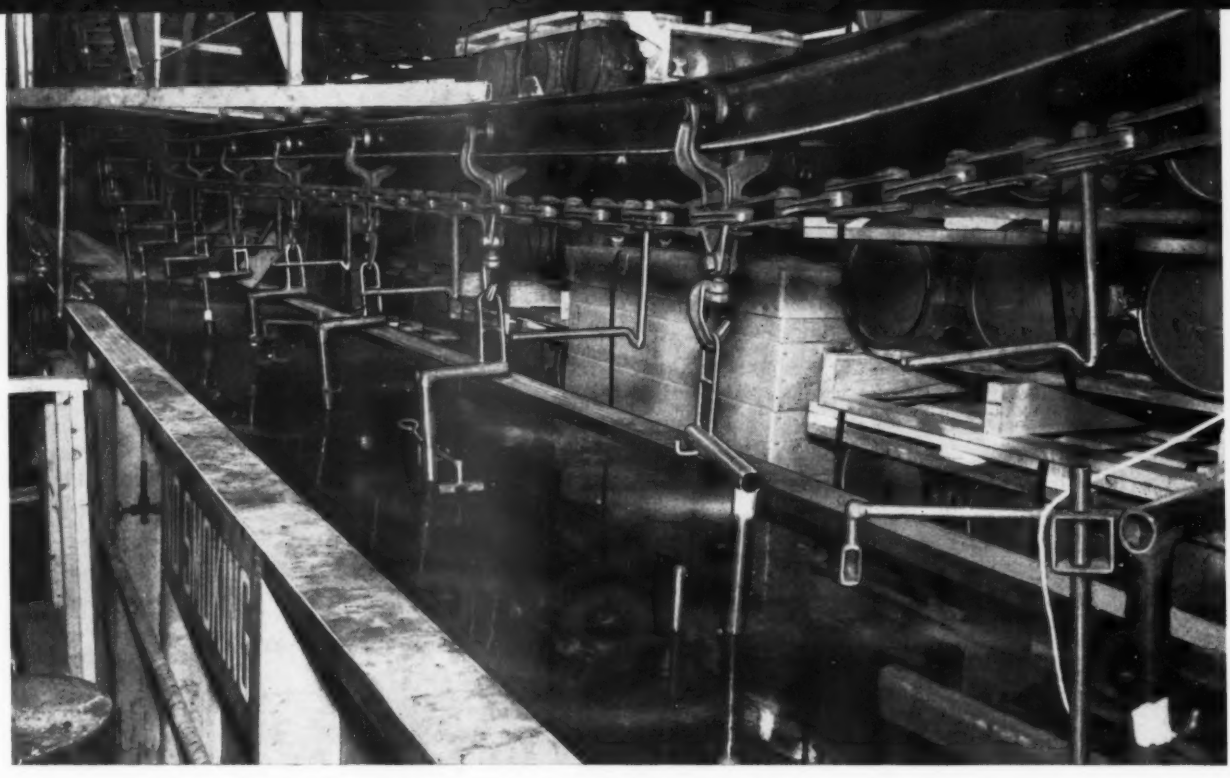
*THE BETTER THE FINISH, THE BETTER THE BUY



Paint removing compounds

a description of the general types of paint strippers, recommendations for their use, and case history information from the appliance and metal products industry

by Fred Zellman • CHIEF CHEMIST, L. R. KERNS CO., CHICAGO, ILLINOIS

IN recent years, the field of industrial finishes has been growing very rapidly, and the many problems encountered, such as surface treatment, application, and removal are becoming more complex. Therefore, it is the purpose of this article to take up briefly the subject of paint removers or strippers which have been developed by the chemical trade for the various types of industrial finishes commonly used.

At the present time, there is no efficient "universal" paint stripper and, due to the wide variety of resins used in today's paints, it becomes necessary in many cases to "tailor-make" a stripper to fit each application. Not only the paint itself, but other factors such as the method of handling, safety rules, and the time cycle allowed for stripping will dictate which stripper will be used.

In order to assist in making the proper recommendations, a table has been prepared, listing general types of paint strippers developed by the producers, and their suggested application. It will be noted that these strippers are divided into three particular groups: 1) Water soluble caustic type; 2) Hot caustic type; and 3) Flush-off type. Each of these types have their particular applications and entail certain drawbacks as well as merits, so that the choice will depend on the various factors outlined.

Because of the wide selection of raw materials available to the paint manufacturers, the combinations that are possible for use in organic finish formulation are literally numberless. For that reason, the accompanying table is meant to serve only as a starting point or guide. It may be necessary to develop an entirely new stripper for certain particular problems, or perhaps only a minor modification will be required.

Insofar as the application of these various strippers is concerned, the following suggestions will indicate the preferred method of use and handling:

(A) Caustic-type strippers should be used at concentrations recommended by the formulator, and heated to their boiling point.

(B) Solvent-type strippers are to be covered by a thin layer of water to prevent evaporation, and are used at room temperature.

(C) Flush-off types are applied by either spray, brush or swab. After being allowed to stay on the surface being stripped for the recommended length of time, they can be flushed off with water.

When making recommendations for paint strippers, the supplier's technical service department requires as much of the following information as is possible to obtain:

(1) Type of paint, manufacturer and code number, baking time and temperature.

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Recommendations for General Types of Paint Strippers

Paint Type	Stripper Type		
	First Choice	Second Choice	Third Choice
Epoxy Base	Hot Caustic Type	Cold Solvent Type	
Alkyd and Alkyd Modified	Hot Caustic Type	Cold Solvent Type	Flush-Off Type
Asphalt Base (Japans)	Cold Solvent Type	Hot Caustic Type	Flush-Off Type
Primers (Chromate)	Cold Solvent Type	Hot Caustic Type	Flush-Off Type
Phenolics & Modified Phenolics	Hot Caustic Type	Cold Solvent Type	
Lacquers	Cold Solvent Type		

(2) Sample of paint and/or painted panels which can be laboratory checked for best possible product.
(3) Equipment and facilities available as to particular type of stripper desired.
(4) Time cycle allotted for stripping operation, in the event it is governed by other production factors.
(5) Metal surface underneath paint (many caustic strippers cannot be used on aluminum or other reactive metals.)

Basic information on general classifications

In general, the cold solvent types consist of chlorinated solvents, in conjunction with other specialized solvents which are combined with necessary amounts of accelerators and wetting agents. The solvents alone would eventually do the stripping job, but in order to speed up the operation, the accelerators and wetting agents are necessary. To maintain the best performance factor of solvent-type strippers, the solids content should be checked periodically and, if above the recommended range, usually 10 per cent to 20 per cent, the tank should be dumped and reclaimed. *(See Note.)*

The water soluble caustic types are usually a mixture of strong alkalies, along with wetting agents and accelerators. These strippers function most efficiently at or near their boiling point and, for maximum results, must be kept near the recommended concentrations. Method of control: in order to maintain proper concentrations, it is necessary to periodically run chemical-control checks as specified by manufacturers.

Flush-off types are specialized compounds and are not as generally used as the solvent or caustic types. Flush-off strippers are used for large pieces of equipment which cannot be immersed, such as aircraft, storage tanks, steel structures, and the like. These strippers are similar in composition to the cold-solvent types, with the addition of thixotropic jelling agents for adherence to metal surfaces, and emulsifiers which promote ease of flush-off with water.

One typical use for this type of flush-off stripper is for an aircraft that has been in "mothballs" with a zinc chromate or other protective coating for any length of time. This, of course, must be removed, so the flush-off type of stripper is sprayed on the plane and, where it adheres, it forms a jell with the coating, and this can be flushed off after a few minutes with a stream of water with reasonable pressure.

Acid and emulsion strippers

In addition to the common types of strippers described, there also are acid and emulsion strippers which are sometimes used, although in relatively few

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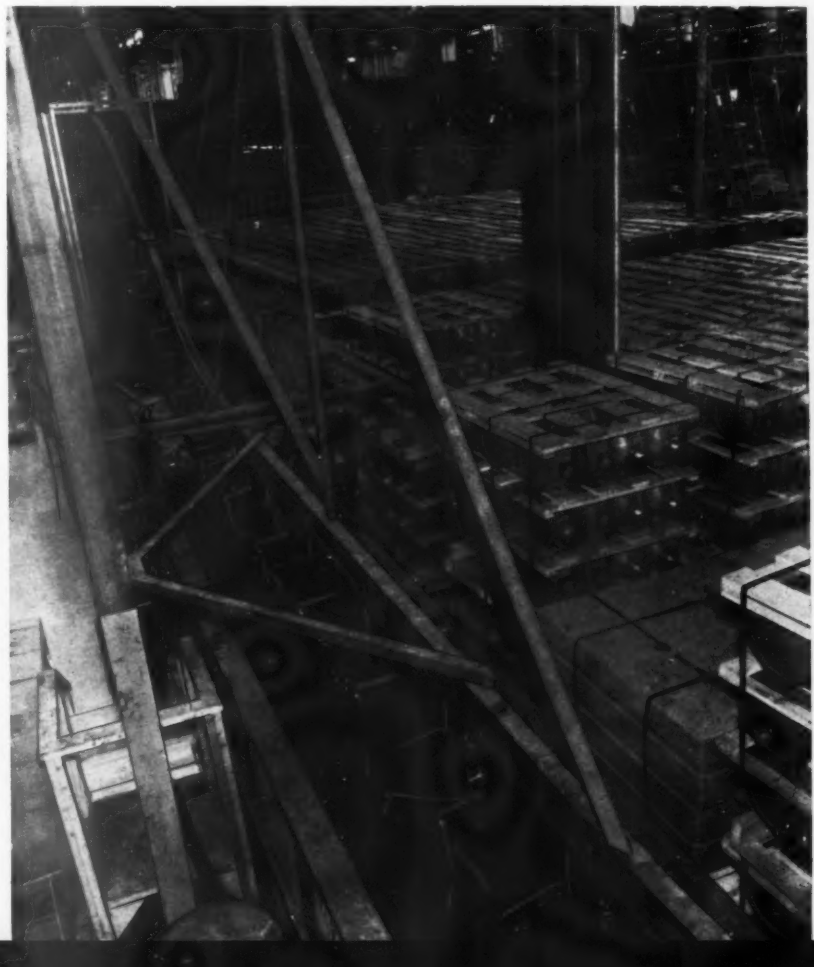
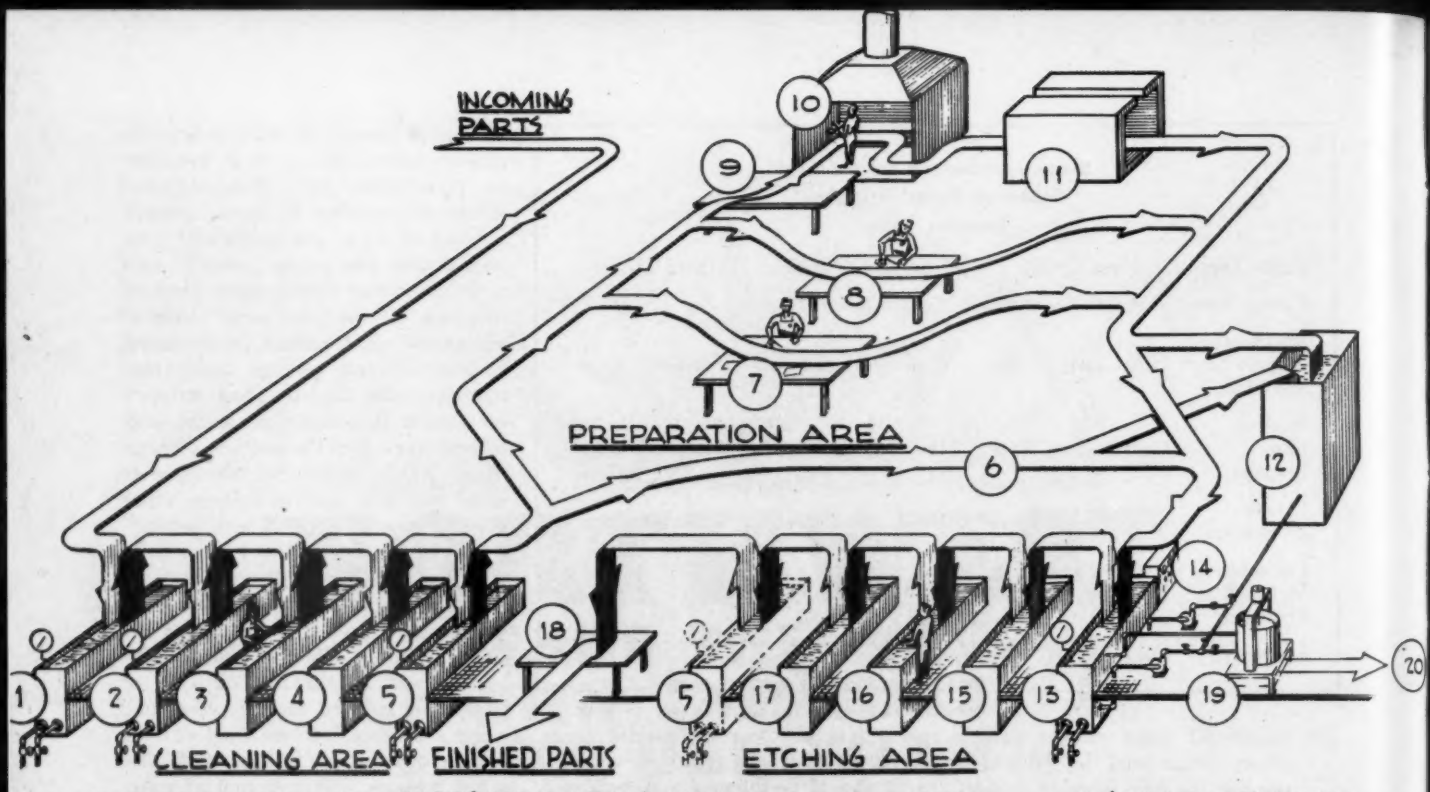


Opposite page: There are many types of equipment, small and large, in use for paint stripping. In this view of the stripping tank in operation at the Hotpoint Co., conveyor carries hooks through solution at proper speed to remove paint as applied, including build-up.

Right: Another view of typical installation, showing how equipment for high production can be installed in minimum space.



Milling with chemicals

a development for handling odd-shaped parts "that couldn't be machined"

by Gilbert C. Close • WESTERN EDITOR

ON May 23, 1956, North American Aviation, Inc., in conjunction with Turco Products, Inc., held the first public showing of a new process by which odd-shaped parts that "couldn't be machined" were actually etched to shape by dipping them into a chemical solution and letting the chemicals etch away the unwanted portions of the metal.

One impression gained from this first public showing of the new method, called the "Chem-Mill" process, seemed unanimous among the engineers, technical writers, and other technicians invited to witness the demonstration. . . . . Chemical milling might well prove to be one of the great innovations introduced to industrial production in this era. It's completely new in concept and in application, and is almost portentous in latent possibilities. Cost of the process is well within the reach of the smallest jobbing machine shop, yet it can perform milling jobs that can't be practically or economically performed by the largest machine shops in the world, tooled with conventional equipment.

New horizons for milling

Chemical milling is definitely not a replacement process, and won't compete seriously with conventional milling practices. Rather, it extends the possibilities of milling and shaping metal toward new and unexplored horizons.

The process was researched and developed by Manuel C. Sanz, head of the N.A. Materials Research and Process Development Group. Put under patent, a leading chemical supply house will market the necessary concentrates for the solutions used.

Though there are still many details to learn about it, chemical milling is well past the experimental phases. More than 30 large companies, mostly in the aircraft and missile fields, have already availed themselves of its use. At North American Aviation, 170 specific parts are being chemically milled for the

BASIC DESIGN of a chemical milling installation (opposite page). Modifications may be made to suit individual requirements.

company's supersonic F-100 "Super Sabre" military fighter airplane. Other hundreds of parts are being produced for the missile development program.

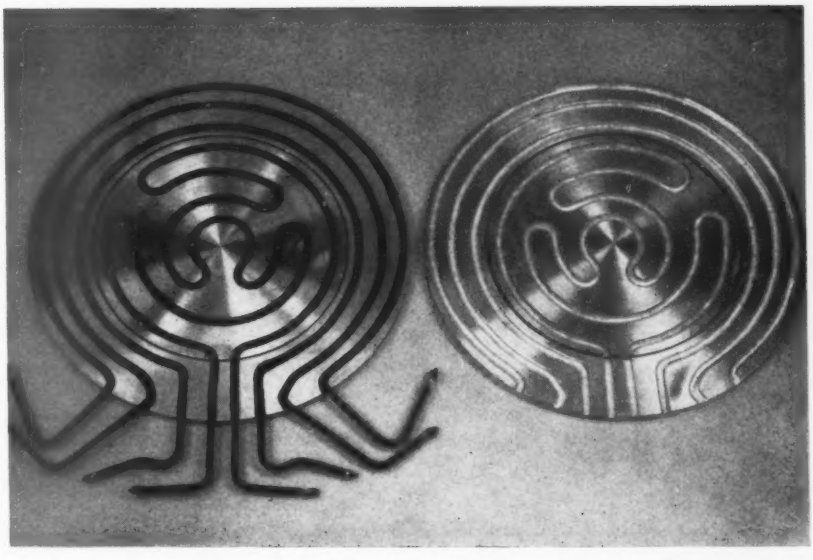
Lines for the chemical milling of aluminum have been in operation for some time, and a line for chemical milling steel and titanium is now operating.

While the basic principle behind chemical milling, that of etching metal, is ages old, the "Chem-Mill" process emerged from the development of methods to control this chemical reaction so that only the desired portions of the blank metal part would be attacked. Further developments included the development of etchants that would act against metal at a predeterminable rate, thus making it possible to remove the part from the solution after the proper interval of time.

Masking solutions employed

The first part of this problem, that of confining the etching action to desired portions of the metal, is accomplished by spraying or dipping a masking solution on the part to be chemicaly milled. This solution dries into a thin film which is chemically resistant, but which has very little adherence to the metal and can be stripped away by hand.

After the masking film has dried, a template corresponding in size and shape to the area of metal to be etched is superimposed upon it. A knife is used to scribe around the template, and the cut-out portion of the film is stripped away by hand. This leaves exposed the area of metal to be etched. In practice, the template used is enough undersize to allow for undercut etching of the metal along the edges of the masking film cut-out. This undercut etching will be equal to the depth of metal removed from the unmasked area.



APPLIANCE MANUFACTURERS, take note! This grid for an aircraft heating element was chemically etched from a solid aluminum blank.

Solution strength, temperature critical

Controlling the speed of etching so that metal is removed at a predeterminable rate is accomplished by adjusting the strength of the solution and controlling its temperature, and by constant agitation in the etching tank so that all metal areas to be etched are attacked evenly. The rate of metal removal by the etching action, largely because it is compatible with most handling equipment now in use, is established at one mil (0.001-inch) per minute of immersion in the etching solution.

This is rapid enough to limit the length of the process to a reasonable time, yet slow enough so that unequal amounts of metal (enough to affect a tolerance) are not removed from differ-

PILOT LINE at Turco Products is shown here. It's used for chemical milling of steel and titanium. The line occupies less than 800 sq. ft. of space.

FLUTED SPIRAL on this complex part for a missile was produced by chemical milling. ←

CHECKING DEPTH of a chemically milled cut-out in the North American Aviation laboratory. Milling speed is precisely adjusted so that 1 mil of metal is removed for each minute of immersion in the etching solution. Very close tolerances can be obtained, as evidenced by military approval for use of the process in producing critical airplane and missile parts. →

ent areas of the part while it is being lowered into and raised from the etching solution. The strength of the etching solution that wets the surface of the part after it is removed from the tank is dissipated almost immediately, so immediate rinsing is not critical.

With no more information than this, the imaginative design engineer or machine shop operator will begin to visualize what chemical milling has to offer. Steel, aluminum, titanium, and magnesium are already being successfully chemically milled. Titanium is almost impossible to mill by conventional methods. Other alloys and metals that are difficult to mill are easily etched in the solution tanks.

Use of in-process masking feasible

By in-process masking, or mask removal after etching has started, different amounts of metal may be removed from different areas of the part. Webs, lightening holes, stiffeners, etc., of any size or shape can be etched. Several parts can be masked out on a single sheet at one time and all of them etched in a single operation. They are then cut apart and trimmed to size after etching. Parts are chemically milled on both sides at once, thus eliminating the turnover and repetition necessary in conventional milling. When a certain thickness of metal is required to provide proper metal flow during forming of a part, the excess metal can be etched away after forming. In fact, the possibility of chemically milling a part after it is formed offers unlimited potentialities.

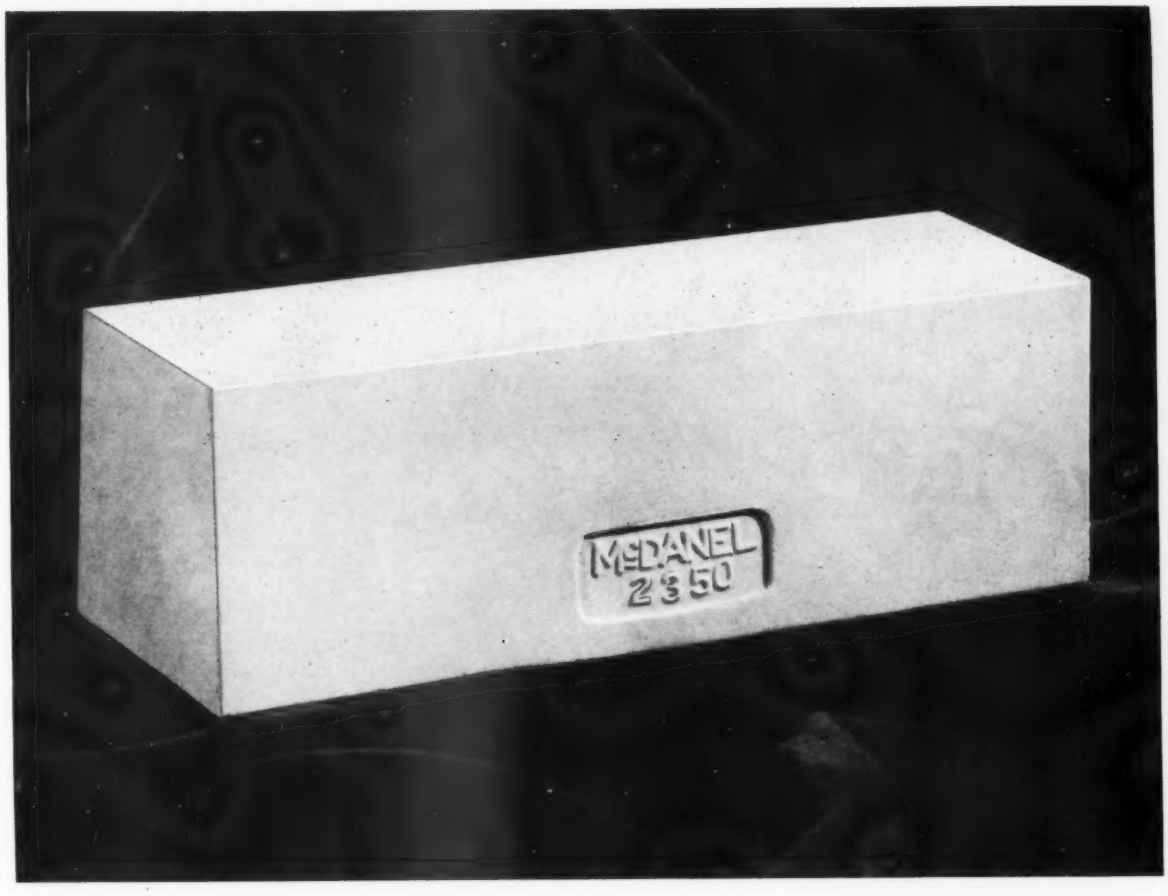
Where large, thin parts are now stiffened by "riveted on" or "welded on" doublers, the method now allows for the doublers to be etched as an integral section of the part. Tapered parts with very close tolerances can be chemically milled by lowering the part into the solution, then withdrawing it slowly and at a steady rate, allowing the etching solution to act progressively longer on the taper as it thins.

Large sheet stock parts can be tapered by the same method. In fact, two-way tapers on a large sheet can be made by lowering it into, or withdrawing it from the solution at a predetermined angle. A conical taper, or a perfect semisphere can be chemically milled by a predetermined but varied rate of part withdrawal. Machines are already on the drawing board that will withdraw the part from the solution at a predetermined steady or variable rate.

Some applications already made

Some companies now using the "Chem-Mill" process are replacing odd-shaped and costly forging by chemically milled parts. Other companies are chemically milling products in one piece that were formerly composed of several machined or milled components. Attack of the chemical solution on the part is not limited by its size, shape, or possible obstructions, and the masking film can be applied on any portion of the part that can be sprayed, dipped, or reached by a paint brush. *to Page 91* →

SMOOTHness of milled surfaces are visible in this close-up of a part chemically milled after it was formed.



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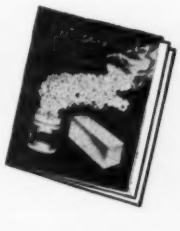

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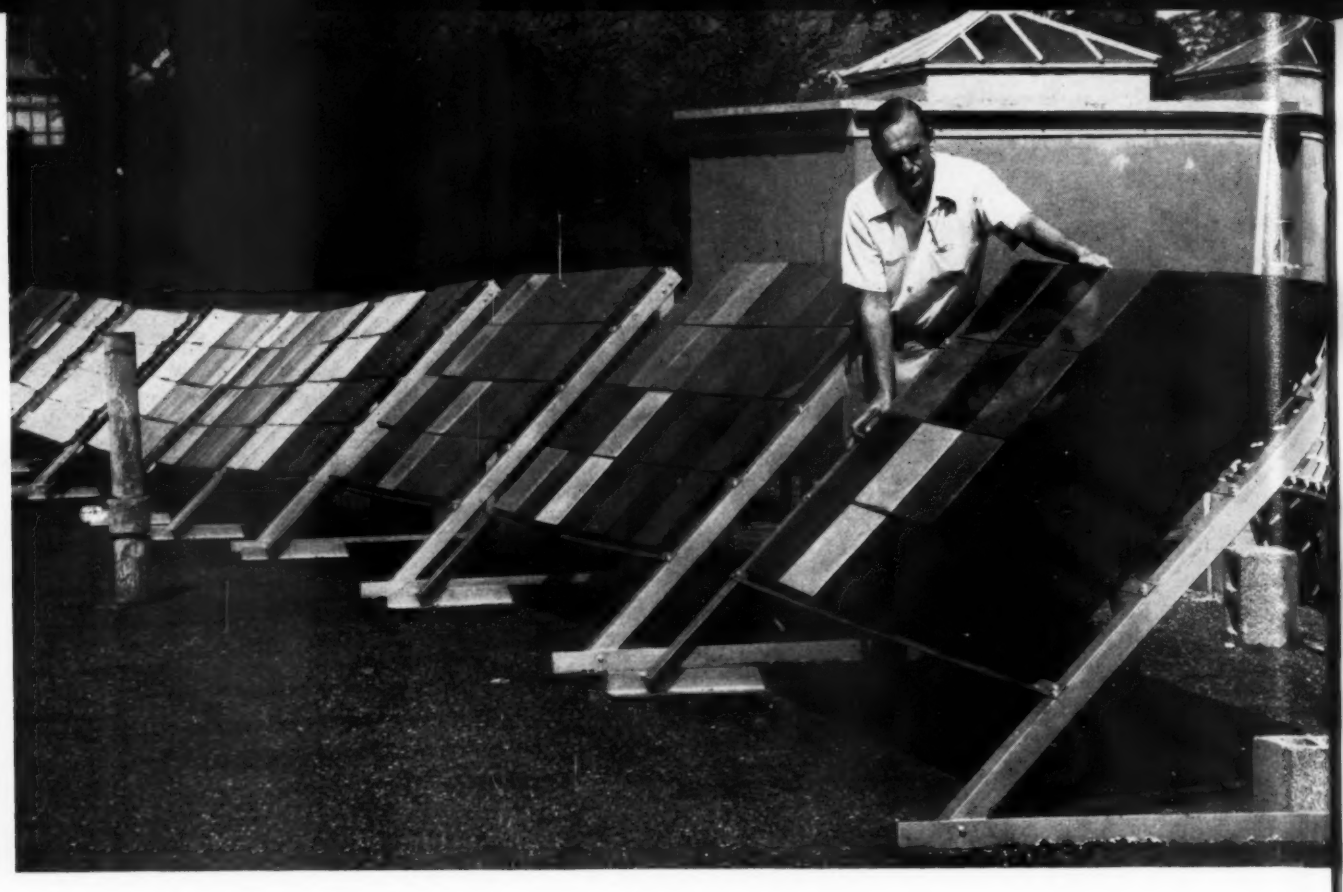


Weathering of porcelain enamels evaluated for architectural uses

REPORT OF AN INVESTIGATION *by D. G. Moore and W. N. Harrison* • ENAMELED METALS LABORATORY, NATIONAL BUREAU OF STANDARDS

THE National Bureau of Standards has recently completed a 15-year weather exposure test of porcelain-enameled steels. Since 1939, the Bureau has been conducting investigations of the weather resistance of such enamels by exposing a large number of samples to four climatic conditions, representative of different parts of the eastern United States. Results of the study (reported earlier in this publication) should be useful to enamel manufacturers in further improving the weather resistance of porcelain enamels, and to architects and engineers in specifying the best weather-resistant compositions.

Large variations were found in the weather resistance of the various enamel types investigated. The enamels affected least by the exposure were those having high resistance to acid attack. The most resistant enamels retained more than 90 per cent of their initial gloss and showed insignificant color changes (less than 1 NBS unit), while some of the enamels of poor acid resistance (which were not of a type recommended for outside exposure) changed from full gloss to a dull finish in 15 years.

Porcelain enameled steel is finding increasing architectural use as an exterior finish for buildings. The material owes its popularity to good weather resistance, economy of construction, ease of cleaning, availability in a variety of colors, and a pleasing appearance. Exploratory installations of porcelain enameled steel as the exterior finish of outdoor structures were made in Germany late in the nineteenth century. However, the greatest impetus to the use of the material for architectural applications has been in the United States. The application of porcelain enamels over a number of decades to architectural installations and advertising and street signs has provided a substantial backlog of experience. However, further information regarding the relative weather resistance of different types of enamel, and the correlation of laboratory test results with performance data, were needed to facilitate the selection of the most durable enamels for architectural use.

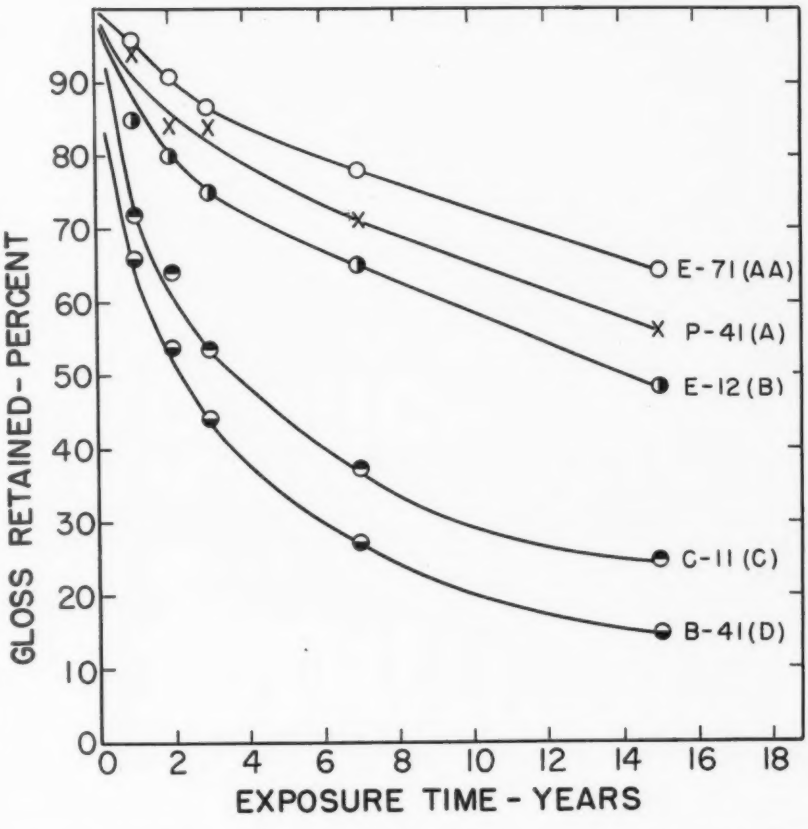
Fourteen types of enamels

For this study 864 panels, 1-ft. sq., and an equal number of 4- by 6-inch laboratory specimens, were prepared by 16 cooperating manufacturers. Fourteen types of enamels were included. The base metal in each case was enameling iron. Exposure sites were selected at Washington, D. C., St. Louis, Mo., Lakeland, Fla., and Atlantic City, N. J.

Left: Porcelain enameled steel panels on roof of the Industrial Building at the National Bureau of Standards after 15 years exposure. Similar specimens were exposed at St. Louis, Mo., Lakeland, Fla., and Atlantic City, N. J.

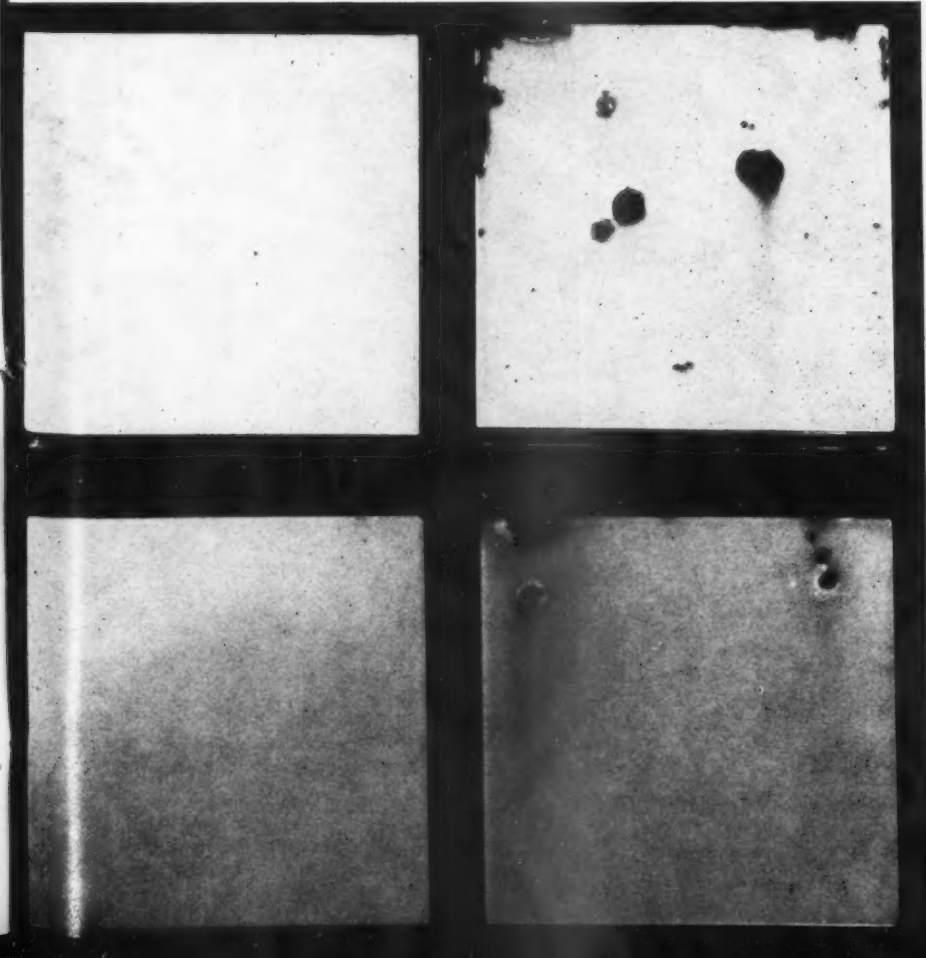
Right: Data showing change in gloss with exposure time for five panels at the Washington site. Letters following panel numbers indicate acid resistance ratings by citric acid spot test.

Below: Four-foot-square panels after 15 years exposure at Atlantic City. Specimens on left had good enamel coverage. Two on right show holes in panel caused by rusting through from areas of incomplete coverage on back side. Damage of this type was more extensive at Atlantic City due to "salt air."



A basic function of the porcelain enamel is to prevent corrosion of the base metal; hence, all of the panels were inspected for evidence of corrosion of the steel base. After 15 years of exposure it was found that, where the initial coverage was complete on all parts of the panel, no corrosion occurred regardless of the type of enamel applied.

On many panels, the reverse side was protected with only a single groundcoat application. In these cases, good coverage of the metal was not always achieved, especially where the specimens had rested on support points during firing. Corrosion started at these points of poor coverage, and spalling of the enamel on the face side opposite the points occurred after the corrosion had progressed only part way through the steel. These spalled areas were more prevalent under the corrosive "salt-air" conditions of Atlantic City than at the other three locations.



Differences in "cleanability" were noted; the surfaces of the high acid resistance were easier to clean after 15 years exposure than those of poor acid resistance. The semi-mat or satin-textured enamels showed about the same cleaning behavior as the glossy surfaces. On the other hand, none of the full-mat enamels could be cleaned satisfactorily, even by a vigorous and prolonged scouring treatment.

Weather resistance measured by specular gloss changes

The weather resistance of the enamel surface was evaluated by measuring the changes in the specular gloss and in the color. Such measurements showed that variations in climate had only a minor effect on the weathering behavior of most of the enamels. The same measurements showed that, on the average, the compositions that were highly resistant to attack by acid solutions were also resistant to the action of weathering.

to Page 90 →

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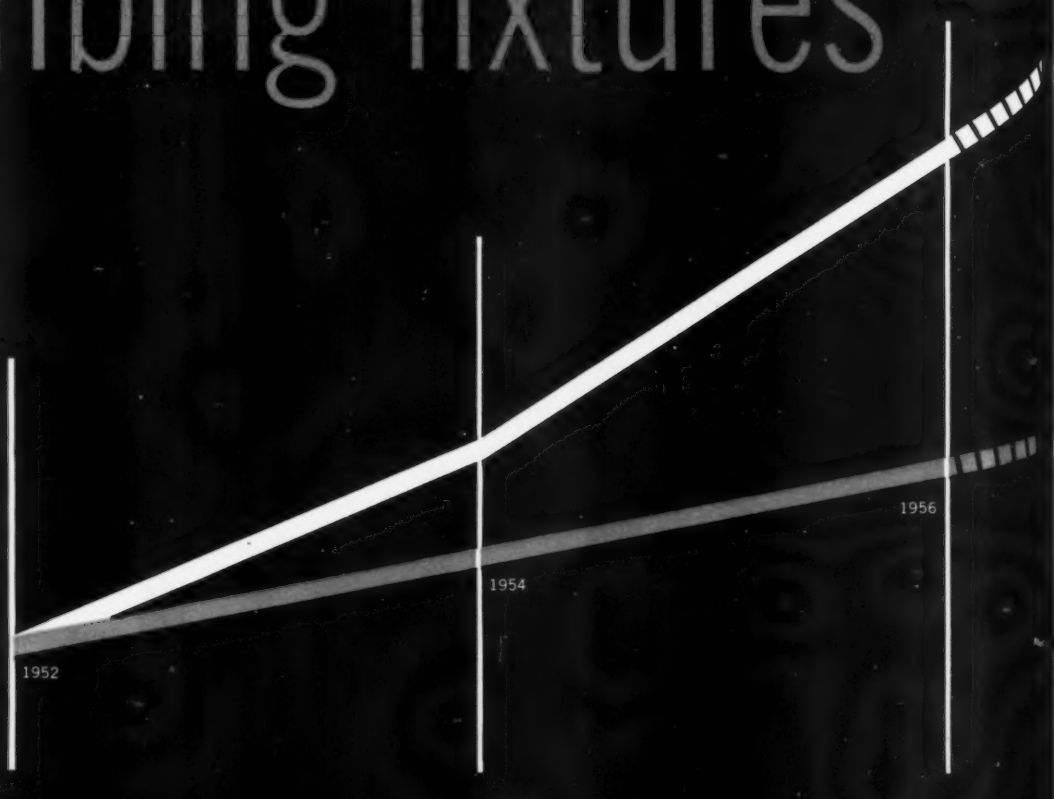

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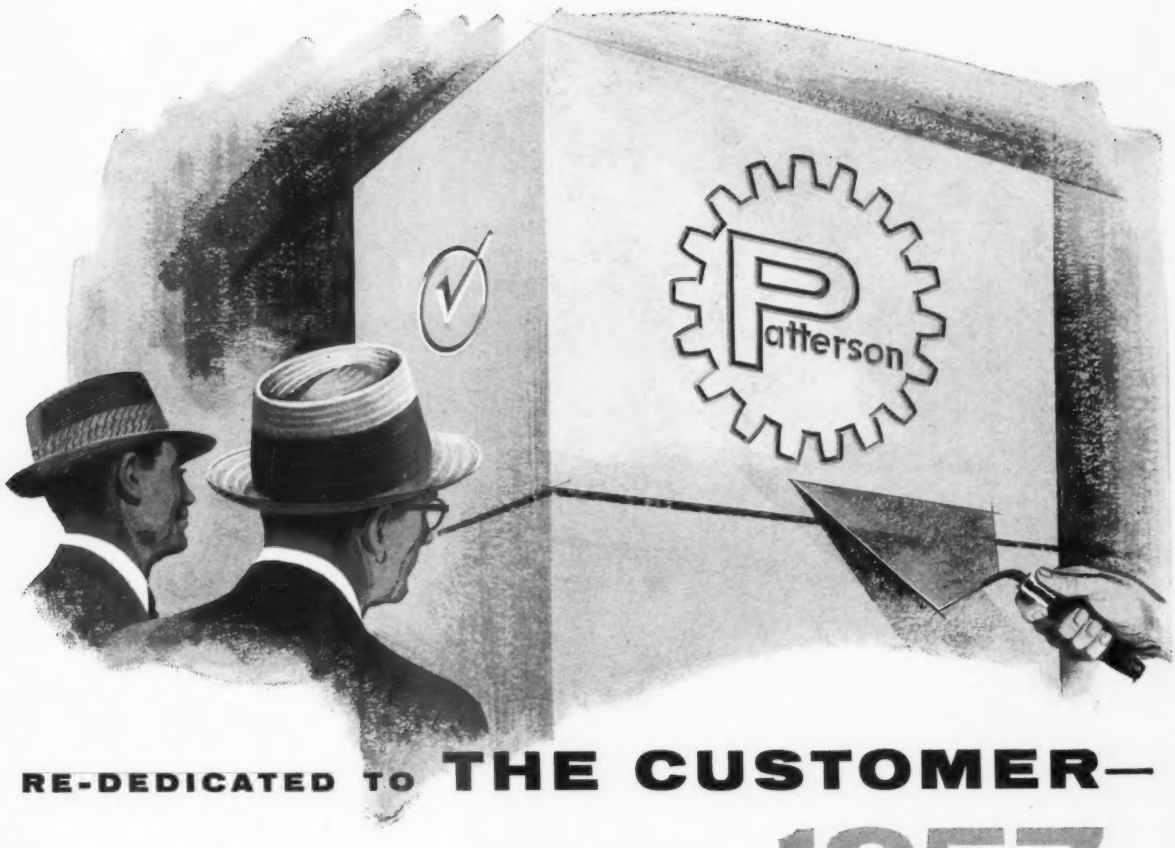

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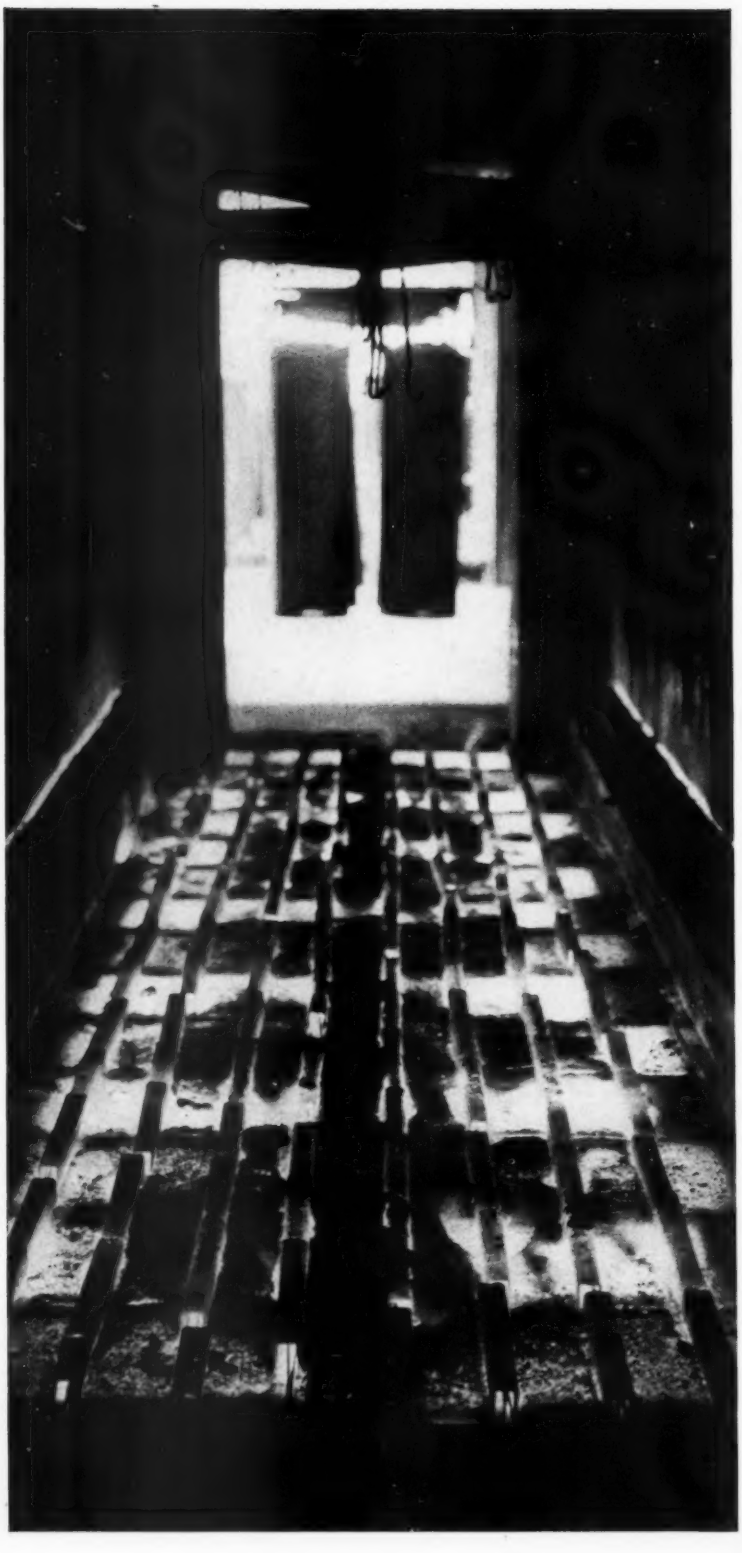

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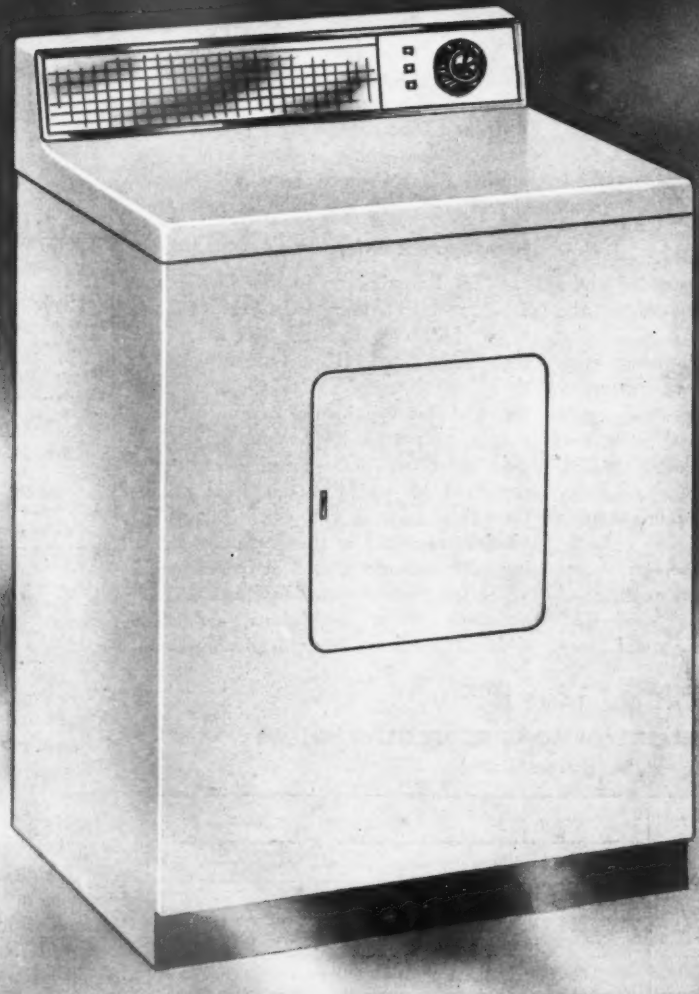

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some experiments and observations on the formation of metal dendrites at ground coat-steel interfaces . . .

Adherence of porcelain enamel ground coats

by R. M. King • PROFESSOR OF CERAMIC ENGINEERING, OHIO STATE UNIVERSITY—TECHNICAL CONSULTANT FOR MPM

IN A SERIES of publications[1] the author and his co-workers reported the precipitation of a metal phase in dendrite form at the interface of the conventional sheet-steel ground coat containing cobalt oxide. It was also reported that when the amount of this oxide was 1.25% the precipitated metal phase was identified by X-ray methods as alpha iron, when the oxide content was 2.5% both alpha iron and alpha cobalt were identified, and when 17% and more of the oxide was added alpha iron, alpha cobalt, and beta cobalt were present as dendrites.

It was also found that when such ground coats were fired in vacuo[2] under certain conditions the ground coats separated from the steel with some violence even before completely cooled. Thus they had little adherence and X-ray examination showed few or no metallic dendrites.

Determination of the electrical resistance[3], during firing and cooling, of an iron-ground coat-iron "sandwich" indicated that sufficient metal was formed to bridge the insulating, ground coat gap and to reduce the resistance to that of the "shorted" circuit, that is from the order of 100,000 ohms to about 5 ohms at room temperatures. These results were obtained even with a ground coat containing 1% of cobalt oxide. When cobalt oxide was not included the resistance remained higher than 100,000 ohms at room temperature.

Investigators differ

Other investigators in this field have found metal precipitates in fired ground coats, but have insisted that they are metallic cobalt. Disagreement among these investigators has arisen as to the cause of this metallic formation, for example, reduction by hydrogen, or by galvanic action. One group of authors criticized all work in this field other than their own as follows: "Practically all data reported in the literature dealing with metallic phases in the enamel, or at the enamel-metal interface, were obtained under conditions differing widely from those occurring in practice. Such expedients as the use of water soluble borax glass, high concentration of adherence oxides, or prolonged firing above the normal range were employed to obtain amounts of metallic phases large enough for studying by methods available. Data obtained under such exaggerated conditions are always open to question."

This criticism is unjustified for two reasons: (1) Fundamental research should cover a wide range of conditions, even exaggerated conditions. Commercial conditions may indicate only one point on a "curve"; (2) the early publications of this author and his co-workers reported numerous studies on conventional ground coats fired under commercial conditions.

In view of these criticisms and in view of new data, improved experimental methods, and more precise X-ray equipment, it was thought desirable to repeat some of the earlier work and review the conclusions.

Since previous work indicated that both cobalt and iron were precipitated

TABLE I

LATTICE CONSTANTS OF SOME IRON-COBALT ALLOYS (Angstrom Units)

Composition of Alloys		a_o	
% Iron	% Cobalt	Alpha Phase	Gamma Phase
100.00	0.00	*2.8665 (Alpha Fe)	——
88.74	11.26	2.8669	——
73.33	26.67	2.8661	——
25.20	74.80	2.8402	——
19.19	80.81	2.8394	3.5562
9.69	90.31	——	3.5543
4.66	95.34	——	3.5491
0.00	100.00	——	3.5439 (Alpha Co)

*All a_o values in this paper have been converted to Angstrom units from kX units in previous papers.

TABLE II

COMPOSITIONS OF GROUND COATS

	1	2
Potash Spar	23.2	28.5
Borax	34.2	33.1
Soda Niter	4.6	5.1
Flint	23.7	19.6
Potassium Nitrate	0.8	—
Fluorspar	6.0	5.1
Soda Ash	5.8	7.6
MnO_2	0.8	—
Co_3O_4	1.0	1.25

from ground coats containing 2.50% and more of cobalt oxide, the possibility of the presence of a cobalt-iron alloy was considered, although X-ray studies revealed lattice parameters very close to the standard values for the pure metals. Precise data on cobalt-iron alloys did not become available until 1941 in a publication by Ellis and Greiner.[4] Pertinent data from this work are given in Table I.

Reidentification of metallic precipitates

The compositions given in Table II were processed to obtain metallic precipitates as follows: Composition 1 was applied in the conventional manner and fired at 1575°F for four minutes. Pieces of iron were buried in a crucible containing fritted and powdered Composition 2. The crucible was placed in a furnace at 1550°F and held at this temperature for one hour, at 1400°F for one hour, at 1300°F for one hour, and then cooled overnight in the furnace.

For X-ray studies the enamel was broken from the metal, ground to pass a 270 mesh sieve and carefully concentrated with a strong magnet. Films were obtained by the use of a North American Phillips powder diffraction camera having a diameter of 114.59 cm. and Ka_1 cobalt radiation (wave length 1.7889).

The lattice parameters calculated from several lattice spacings in metal precipitates from these ground coats are given in Table III.

TABLE IV

SOME ELECTRON TRANSFER REACTIONS AND OXIDATION POTENTIALS*

Reaction	Potential (E^0)
1. $Fe = Fe^{++} + 2e^-$	0.440
2. $Co = Co^{++} + 2e^-$	0.277
3. $Ni = Ni^{++} + 2e^-$	0.250
4. $H_2 = 2H^+ + 2e^-$	0.000
5. $H_2 + 2OH = H_2O + 2e^-$	0.828
6. $Cu + I^- = CuI + e^-$	0.185
7. $Cu + Cl^- = CuCl + e^-$	–0.137
8. $Ag^+_2 + O^{2-} = 2(Age^-) + \frac{1}{2} O_2$	
9. $4FeO = Fe + Fe_3O_4$	
10. $3FeO + CoO = Fe_3O_4 + Co$	
11. $Fe + CoO = Co + FeO$	
12. $2FeO + CoO = Fe_2O_3 + Co$	

*Values for oxidation potentials are from Wendell M. Latimer: "The Oxidation Potentials of the Elements and Their Potentials in Aqueous Solutions," 2nd Ed. Prentice-Hall, Inc. (1952).

Discussion of the x-ray data

It is apparent that values of a_o for alpha iron are higher than the one reported by Ellis and Greiner. This may be interpreted in one of two ways: (1) The difference is due to error, or (2) a high-iron cobalt-iron alloy is indicated. The error is estimated to be not less than three in the fourth decimal place. If the value 2.8671 is reduced by three, we have 2.8668 which is fairly close to 2.8669 for the alloy containing 88.74% iron and 11.26% cobalt.

It will be noted that only one line was found indicating alpha cobalt and the a_o value was high as compared to that of Ellis and Greiner. On the other hand the agreement among the values for beta cobalt is quite close.

Although it is the judgment of this author that alpha iron, alpha cobalt, and beta cobalt may be precipitated separately, it is possible that alloys also may be formed, but regardless of the interpretation favored it is apparent that iron alone, or as an alloy high in iron, may be precipitated at a ground coat-iron interface and that this fact must be taken into consideration in the formulation of a theory of metal formation.

TABLE III

VALUES OF a_o FOR METALLIC PRECIPITATES (Angstrom Units)

	Alpha Iron		Cobalt	
Composition	1	2	1	2
	2.8550	2.8543	—	—
	2.8516	2.8586	—	α 3.5457
	2.8631	2.8619	—	—
	2.8661	2.8650	—	—
	2.8672	2.8669	—	—
			2.513 (β cobalt)	
			2.595 (β cobalt)	
Corrected Values*	2.8674	2.8671		
Previous Values	2.8558 (α Fe)		3.5573 (α Co)	2.5130 (β Co)
Ellis & Greiner	2.8665 (α Fe)		3.5439 (α Co)	2.5070 (β Co)

*Corrections for absorption and other factors were made for alpha iron by the use of a complicated function of the angle of reflection. The accuracy obtained is not better than three in the fourth decimal place.

Some electron transfer reactions

Dietzel[5] claims that cobalt alone is formed under the conditions described above and that this is the result of the difference in oxidation potentials. Standard oxidation potentials do not necessarily apply here, as such potentials are based on the presence of the element as simple ions, of unit activity, and in water solutions. Concentration of ions as well as types of cations and anions influence oxidation potentials as will be seen from Table IV. This table also reveals that reactions represented by the table of standard oxidation potentials are not the only electron transfer reactions.

Equation 9 represents the well established reaction for the decomposition of FeO, or wüstite, below 573°C on cooling, to produce metallic iron and magnetite. Equation 10 was reported by Benard[6] to represent the decomposition

to Page 62 →

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Adherence *from Page 59*

of solid solutions of FeO and CoO at higher temperatures than 573°C. Benard also established the fact that a combination of these two reactions produced both cobalt and iron at temperatures below 573°C, a fact which suggests an explanation for the presence of iron and cobalt at the ground coat-steel interface. This explanation is supported by the studies on electrical resistance of ground coats referred to above.[3]

Equations 11 and 12 were given by Dietzel[5] to confirm his galvanic theory of metal formation. Equation 12 is substantially the same as Benard's equation 10.

Berry[7] has shown that metal filaments and dendrites may be obtained by processes not presented by conventional electron transfer reactions. He heated thin layers of silver iodide, bromide, and chloride on blocks of silver until melted and then on a hot plate at about 400°C. Silver filaments 1 cm. long grew out of the silver iodide within 24 hours, and from silver chloride and bromide copious dendrites 4 mm. long grew after "several" hours of heating. Similarly copper can be made to grow through copper sulphide.

This author has repeated successfully the experiments with silver iodide.

It is apparent that either iron or an iron-cobalt alloy high in iron content is precipitated at the interface of a ground coat containing cobalt oxide when fired on steel at maturing temperatures. Whether this metal formation contributes to adherence depends upon the quality and extent of proof required.

It has been found that normal firing produces metal dendrites and good adherence, but firing under certain conditions in vacuo produces no detectable dendrites and no detectable adherence. It has been shown by resistance measurements of thin layers of ground coats fired between two plates of iron that the precipitated metal is in contact with these plates and is sufficient in quantity to reduce the resistance of the insulating layer to that of the shorted circuit. Thus the precipitated metal must be bridging the gap between the plates of iron.

The thought is prevalent in some quarters that one can observe the blue color of a ground coat to disappear during firing. After many experiments with ground coats with as little as 0.2% of cobalt oxide this has not been confirmed.

Summary and conclusions

1. Data have been obtained that support the conclusions of previous work that metal precipitates of high iron content are formed at the interface between iron and a ground coat containing cobalt oxide.

2. When the concentration of cobalt oxide is of the order of 1%, the precipitated metal is iron or predominantly iron, although some cobalt may be detected by careful examination.

3. It is believed that the mechanism involved is similar to that found by Benard for the decomposition of FeO-CoO solid solutions. This is supported by resistance measurements of layers of ground coats fired between two iron plates.

4. Facts supporting a proof that this metal formation contributes to adherence are given.

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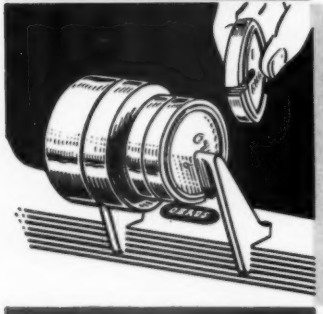

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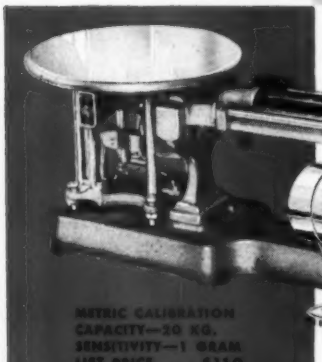

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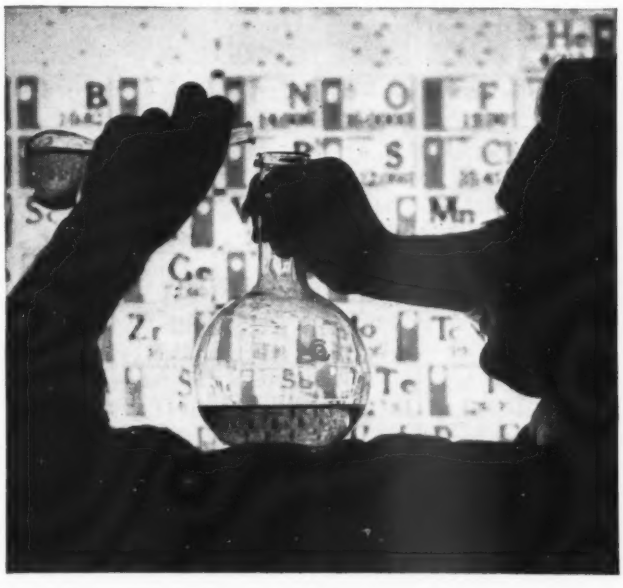


NEW PORCELAIN ENAMELS FOR ALUMINUM

These new Vitro finishes offer many important new advantages *plus* new production economies. They're available in a full range of colors and in four different types—either low in lead content or entirely lead-free—to meet any production needs. They can be applied easily and economically on wrought or cast aluminum at temperatures ranging from 800° to 1000°F, will give you any surface texture desired from high gloss to matte, and are highly resistant to weathering, sulfides, acids and alkalis.

From the standpoint of economy, you can't beat Vitro porcelain enamels for aluminum. Their initial cost is surprisingly low; and they provide high opacity whether used for one or two coat applications. Also, they fire very uniformly and are lightfast and extremely durable. Use them and you're sure to lower your production costs *and* improve the quality of your products.

If you would like additional details on these new Vitro enamels or samples for testing, write us today. There's no obligation.

Colors by Vitro

VITRO MANUFACTURING COMPANY • 60 Greenway Drive, Pittsburgh 4, Pa.

A Division of Vitro Corporation of America, West Coast Plant: 1625 West El Segundo Blvd., Compton, Cal.

The electroplating of zinc die castings

rolled and die cast zinc, in its various basic designs and complex shapes, is taken through the electroplating process in this article

by Ernest Horvick • AMERICAN ZINC INSTITUTE, INC.

PART THREE
CONCLUSION

WORK which has been given a nickel strike coating in the sodium sulfate type of solution may merely be rinsed thoroughly in cold water and transferred immediately to the warm nickel bath. The rinsing should be thorough, since contamination of the warm nickel solution with sodium salts may prove harmful. The work should not be allowed to dry before being placed in the final nickel bath or else peeling may occur at the interface of the two nickel deposits.

It is necessary to neutralize the alkaline cyanide-copper solution adhering to work given a copper strike. This is usually accomplished after thoroughly rinsing the work by a brief immersion in a sulfuric acid solution of from 5 to 20 per cent, by volume, concentration, operated at room temperature. Following this treatment the work is again rinsed and is ready for nickel plating.

ZINC DIE CAST radiator emblems descending into the precleaning bath at Lee Silver Service, Inc. The emblems will be channeled through the cleaning process, traveling 95 feet before coming to the electroplating phase.

The hazard involved in bringing cyanides into acid solutions should be kept in mind and the rinse prior to the acid dip should be thorough.

Where proprietary copper plating solutions are used, special procedures may be necessary. Information should be obtained from the purveyors of such solutions.

While these intermediate steps are by no means complex, reasonable care should be exercised in carrying them out in order to avoid undesirable peeling of the final nickel coating.

Final nickel coating

As pointed out in the section on "*Direct Nickel Plating*," the ordinary warm nickel solutions cannot be used for the direct plating of nickel on zinc. Advantage can be taken, however, of their desirable characteristics by first protecting the surface of the zinc by either of the strike coatings described.

A number of nickel baths capable of depositing a bright nickel requiring little or no buffing have been developed in recent years and the majority of platers handling zinc die castings are using one or another of these solutions. While it is not within the province of this paper to indicate any preference between the available solutions, it may be commented that outdoor exposure tests of a limited number of samples plated in four representative solutions have indicated that bright nickel coatings may be expected to yield as good protection, thickness for thickness, as dull nickel coatings. The choice of solution resides with the plater.

In commercial practice, bright nickel is universally applied over a copper strike coating.* The conditions of operation and the control of solutions are

*(see note next page)

largely proprietary and the reader is referred to the purveyors of these solutions for advice in this connection. No bright nickel solution is available today from which nickel can be deposited directly on zinc.

Occasions may arise where it is desirable to use the older types of warm nickel solution. The following formula is representative of the so-called Watt's solution.

Nickel sulfate	35 oz./gal.
Nickel chloride	4.5 oz./gal.
Boric acid	4 oz./gal.

The operating details as commonly used in commercial practice are as follows: **pH** — The pH of this type of solution is normally held in the general range of 4.5 to 5.5 when used in plating over copper on zinc. Lower pH may increase to an undesirable extent the attack on uncoated zinc surfaces. **Temperature** — This type of solution is ordinarily operated between 110 and 120°F. (43 to 49°C.). **Current density** — Practice in various plants differs in that current densities from 10 to 60 amperes per square foot are used. The preferred range appears to be from 20 to 30 amperes per square foot. It may be pointed out that too low a current density may permit undesirable etching of the zinc casting through small defects in the primary coating.

Agitation — Agitation will tend to reduce pitting and porosity. In commercial practice the same general rates of cathode rod motion are used as were indicated in the section on Direct Nickel Plating. In semi-automatic tanks a conveyor speed of 1 to 2 feet per minute is common.

Pitting — Warm nickel solutions have a general tendency to develop an exaggerated type of pitting. This condition can be overcome by additions of hydrogen peroxide. Care should be taken to avoid excess amounts and continuous filtration of the solution is recommended to minimize the necessity for peroxide additions. Sodium perborate should be used with caution since the presence of sodium ions in a solution of this type may result in an undesirable restriction on current density and an embrittlement of the plate.

Sodium salts should not be permitted to enter the solution. When the solution is pure, very high current density can be employed without burning. The presence of sodium salts very definitely restricts the operation to lower current densities which not only do not utilize the full productive capacity of the solution but also permit excessive zinc pick-up. For these reasons the rinsing between nickel tanks should be thorough, sodium perborate should not be used to prevent pitting, and additions of alkali to raise pH should be made with ammonium hydroxide rather than sodium hydroxide.

Rotation of work — It is advisable when using the multiple nickle method to rotate the work being plated so that a load of complicated shapes, which accelerate zinc pick-up, is followed by several loads of simple shapes on which more zinc will plate out with the nickel than is dissolved. This practice tends to hold the zinc content of the warm solution at a level which does not harm the quality or appearance of the deposit.

Thickness of coating — Copper-nickel coatings are likely to develop unsightly brown stains when exposed outdoors unless the nickel coating is relatively impervious. The minimum thicknesses given in Section V should be rigorously observed.

Plating Time

The approximate time of plating required to produce various thicknesses of copper and nickel are presented in the following tables.

Chromium may be applied as a thin finish coating over nickel from any of the various solutions commonly available. The formula given below, while typical, is by no means the only one commercially used.

CrO_3	33 oz./gal. (250 grams per L.)
H_2SO_4	3 oz./gal. (2.5 grams per L.)

Most commercial chromium plating solutions are operated at about 115°F. (45°C.) at current densities ranging from 100 to 200 amperes per square foot. Normally, a 2-5 minute deposit should be sufficient to produce the thin coatings required. Most platers use an alloyed lead anode, some containing 6 per cent antimony, some 7 per cent tin, and others a small amount of tellurium.

While deposits of the order of .0002" can be produced by direct plating of chromium on zinc, the coatings are not bright and require buffing to produce a good luster. Such deposits may have some specific applications but apparently are not generally useful where corrosion resistance is required. However, advantage can be taken of the exceptional abrasion resistance of chromium to improve the wear resistance of zinc surfaces to unusual abrasion.

Such coatings may be produced from the above solution either at the indi-

to Page 90 →

TABLE I

Approximate Time* in Minutes to Produce Copper Coatings of Various Average Thicknesses from Cyanide Solutions

Thickness In.	Weight Grams/ Sq. Ft.	Amperes per Square Foot 10	15	20	25	30	35	40
.0001	2.1	10.5	7	5.5	4	3.5	3	2.5
.0002	4.2	21	14	11.5	8.5	7	6	5
.0003	6.3	32	21	16	12.5	10.5	9	8
.0004	8.4	42.5	28	21	17	14	12	10.5
.0005	10.5	53	35	26.5	21	17.5	15	13
.0006	12.6	64	42	32	25	21	18	16
.0007	14.7	74.5	49	37	29.5	24.5	21	18.5
.0008	16.8	85	56	42	34	28	24	21
.0009	18.9	96	63	48	37.5	31.5	27	24
.0010	21.0	106	70	53	42	35	30	26

*Based on 50 per cent cathode efficiency. The actual cathode efficiency varies somewhat from solution to solution. Th values given here are indicative of the approximate time required under commercial conditions.

TABLE II

Approximate Time* in Minutes to Produce Nickel Coatings of Various Average Thicknesses

Thickness In.	Weight Grams/ Sq. Ft.	Amperes per Square Foot 15	20	25	30	35	40
.00015	3.1	12	9	7	6	5	4
.0003	6.1	23	17	14	12	10	9
.0005	10.2	38	29	23	19	16.5	14
.0006	12.2	46	34.5	28	23	20	17
.0008	16.3	61	46	37	31	26	23
.0010	20.4	77	57.5	46	38	33	29
.0015	30.6	114	87	69	57	49.5	42
.0020	40.8	154	115	92	76	66	58

*Based on 100 per cent cathode efficiency. In the types of solution discussed in this bulletin this value will be nearly approached. It may be necessary, however, to increase the times slightly to obtain the full weight of coating desired.

* No consideration has been given to any possible patent situation involving bright nickel plating either over copper or over nickel. This must be taken into account by the plater.

ARI fourth annual meeting

→ *from Page 31*

between marketing and the other areas of management responsibility."

In Mr. Bund's presentation, marketing was defined as covering all the separate functions which are involved in moving goods or services from production to final consumer (either an individual or an industrial user).

Total sales volume attained is no longer a valid yardstick for business success. It is replaced by profitability of the operation, according to this speaker. *"There has been a steadily growing pressure from top management for a firmer basis in forecasting and planning. This is leading to growth in the marketing research function."*

"The expansion of management budgeting has also generated more insistent demands for facts and knowledge to replace the "hunch" or guess work. There is also a growing demand," he said, *"for better integration of advertising and promotion with the other marketing activities.* This is compelling changes in both personnel and their methods of operation. *There is especially a need of management's insistence on making advertising serve better the field selling effort.* A great many advertising departments are not oriented to put the first emphasis on assistance to salesmen. Many ad managers plan their programs without adequate information about sales objectives and sales plans," Bund said.

"Increasingly, ad men are being required to spend considerable time in the field, "on the front line" in order to verify and, if necessary, modify their assumptions about the effectiveness of the company's advertising and promotion work."

"Actual selling and managing of salesmen is the one type of experience which is increasingly recognized as an absolute prerequisite for the top spot in marketing. A much broader background is *desirable.* Possibly including past service in engineering or some other staff capacity."

"There is also growing emphasis on administrative ability and human relations skills. Administrative ability and human relations are playing a major part in grooming some top marketing executives for still higher assignments", Mr. Bund stated.

This speaker used organization charts to show how the new concept in merchandising organization works out for appliance and other manufacturers.

IAM 25TH ANNIVERSARY CONVENTION AND EXHIBIT SCHEDULED

The Institute of Appliance Manufacturers' will hold its 25th Anniversary Convention and Exhibit at the Netherland-Hilton Hotel, Cincinnati, Ohio, June 2-5. An interesting and varied program has been arranged, and prominent speakers have been retained to highlight the four-day session.

SCHEDULE OF EVENTS

SUNDAY, JUNE 2

4:00 EXHIBIT PREVIEW

A reception for exhibitors by the officers and trustees of the Institute of Appliance Manufacturers. This informal party gives early arrivals a chance to get a preview of the 75 outstanding exhibits.

MONDAY, JUNE 3

10:00 GENERAL SESSION

PRESIDENT'S MESSAGE ON 25th ANNIVERSARY
LEONARD RAULSTON,
Vice President
United States Stove Company

DIVERSIFICATION FOR GROWTH
T. SPENCER SHORE,
President
Eagle-Picher Company

CONSIDERATION OF PROPOSED AMENDMENTS TO IAM BY-LAWS

THE MIDDLE-MAN'S SQUEEZE
TOM C. CAMPBELL,
Editor-in-Chief
The Iron Age

12:30 GENERAL LUNCHEON

2:00 MEETING OF BOARD OF TRUSTEES

This session is devoted to the business affairs of the Institute. The Trustees will hear reports on present and future activities programs, the trend of mergers in the industry, proposed investigations of the appliance industry by Congress and FTC, and a report on sources for capital for the appliance industry. There will also be the usual reports from the Managing Director on the HOME APPLIANCE BUILDER and the Institute's financial status.

2:00 GAS HEATING DIVISION

Presiding: C. D. ALLISON,
Vice President
Dearborn Stove Company

UPGRADING THE GAS HEATING INDUSTRY
H. N. OLDHAM,
New Business Manager
Pioneer Natural Gas Company

Sales and Inventory Trends

Housing in 1957
Private construction
Public housing
Military housing

Activities of the National LP-Gas Council

Trend of Ordinances Affecting Gas Heating

A Round-Table Conference on Cost Trends in the Heating Industry

TUESDAY, JUNE 4

10:00 GENERAL SESSION

PROGRESS IN HOME APPLIANCES —1932-1957
An illustrated talk by LEWIS W. SELMEIER, Advertising Consultant

"WHAT IS PAST IS PROLOGUE"
HAROLD B. WESS, Professor
Business Administration and Marketing
American University

TRAINING MEN FOR SERVICE AND SALES
STANLEY E. FOWLER
Geo. D. Roper Corporation

2:00 OIL HEATING DIVISION

Presiding: W. H. HOHMEYER,
Manager of Market Research
Detroit Controls Corporation

THE FUTURE OF THE OIL SPACE HEATER
MARC RESEK, Vice President
Perfection Industries, Inc., Division of Hupp Corp.

Sales and Inventory Trends

Progress Report on Serviceman's Handbook and Brochure
Promotion for fall heating season
Action on requests for translations into Dutch, German, and French

Speakers' Bureau on Vaporizing Oil Burning Equipment

Trends in Ordinances Affecting Oil Heating

2:00 KITCHEN EQUIPMENT DIVISION MEETING

Presiding: A. B. RITZENTHALER,
Vice President
The Tappan Stove Company

Theme: APPLIANCE MODERNIZATION—SALES UNLIMITED

BUILDING REPLACEMENT SALES
RONALD RINGENBERG,
Assistant Sales Manager
Mutschler Brothers Company

MERCHANDISING APPLIANCES INSTEAD OF PRICE
A. A. GREENBERG,
Business Manager
National Furniture Review

STAINLESS STEEL AS A COORDINATOR IN KITCHEN DESIGN
RICHARD E. PARET,
Stainless Steel Specialist
American Iron and Steel Institute

THE COLOR ENIGMA
JOHN R. McCORD,
Director of Public Relations
Ferro Corporation
CARL R. SMEDLEY,
Director, Color Research
The Glidden Company

Discussion Period

7:00 PRESIDENT'S RECEPTION AND DINNER

CHARLIE KEHRER AND HIS ORCHESTRA
Music for Dinner and Dancing

THE CINCINNATIANS
An Outstanding Male Choral Group

CARMEN LOPEZ
An Exciting Latin American Dancer

WEDNESDAY, JUNE 5

10:30 NEWS CONFERENCE—"OUTLOOK"

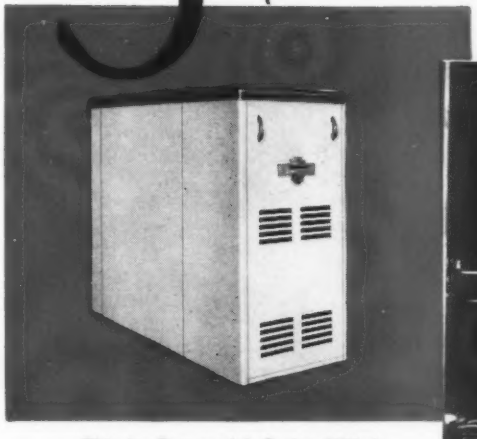
CHET HUNTLEY
National Broadcasting Company

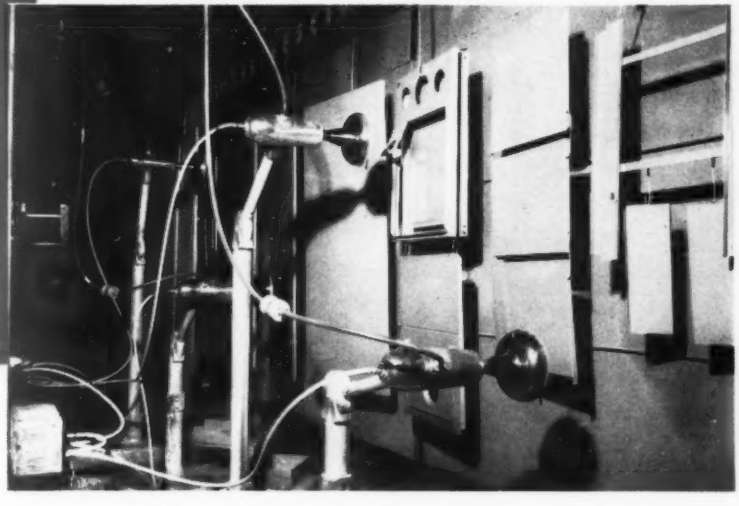
One of NBC's ablest commentators, Mr. Huntley will report on the "Outlook", the name of his Sunday television program. He will outline the major news stories of the day and set them in the perspective of the businessman who is trying to appraise their effects on business.

1:00 ROUND-UP LUNCHEON

The exhibit booths will be open from 9:00 to 5:00 on June 3 and 4, and from 9:00 to 1:00 on June 5. During the General Sessions, exhibitors are urged to have most of their representatives attend the meetings—equally valuable to suppliers and manufacturers.

3 times as many Furnace Casings per gallon of paint with RANSBURG NO. 2 PROCESS!





This Lo Boy model, Series 6000, is typical of the Waterman-Waterbury line of winter air conditioners now painted electrostatically.

Quality of work is improved; Labor costs are cut and Production Stepped up 150% with

RANSBURG Electrostatic Spray Painting

Results exceeded expectations when Waterman-Waterbury, Minneapolis, modernized their finishing department and went from hand spray to Ransburg No. 2 Process in painting their quality line of heating and air conditioning equipment.

By the former hand spray method, W-W used a half gallon of paint to coat a single casing. Now, with Ransburg No. 2, they get SIX CASINGS PER GALLON . . . or 3 times as many per gallon. Furnace casings, as well as other painted parts which go into the famous Waterbury Furnaces, now get a uniform coating of .8-mil.

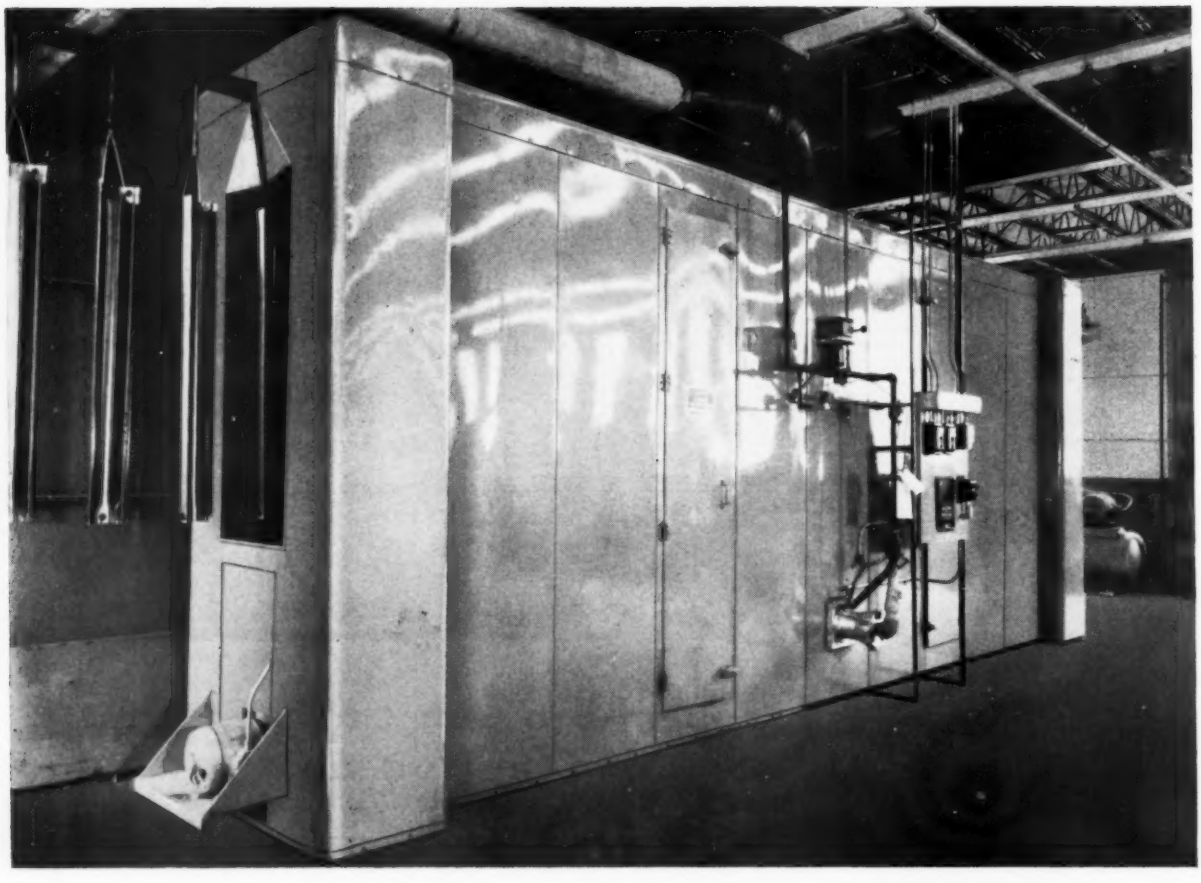
Production was increased, too, as automatic painting enabled them to step up the conveyor speed from 7 fpm to 11½ fpm. Where they formerly turned out a complete furnace in five minutes, NOW they assemble three in just six minutes . . . an increase of 150%. All in all, they figure the modernization program—with Electro-Coating—saved over $11,000 in the first three months of operation.

NO REASON WHY YOU CAN'T DO IT TOO!

Whatever you paint, we'd like to tell you more about the efficiencies and worthwhile savings which can be yours with Ransburg Electro-Coating Processes. Get our No. 2 Process brochure which cites many on-the-job examples of electrostatic spray painting on a wide variety of products. Or, we'll be happy to loan you our new film, "The Big Attraction" which tells the electrostatic spray painting story in sound and full color. Call or write

RANSBURG
Electro-Coating Corp.
Barth and Sanders, Indianapolis 7, Indiana

INTEGRATION



Perhaps you'll agree that one of the most important phases of manufacturing is to blend your production facilities into a smooth-running operation.

This is specially essential in your finishing system. It takes a complete understanding of your product—and the steps to produce the quality of finish required—to successfully integrate finishing ovens, conveyors, washing machines, spray booths, etc. The end result is a profitable, quality product—with a minimum operational cost.

ALWAYS CONSIDER THESE SIX QUESTIONS

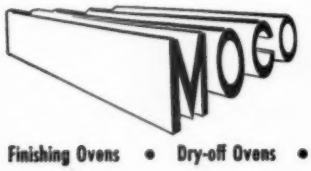
- Does the finishing system have capacity for increased production?
- Is the equipment simple enough to allow easy maintenance?
- What type of materials handling is best suited for your process and production?
- Are floor space requirements at a minimum?
- Has the system been engineered for lowest operational cost?
- Does safety equipment provide sufficient protection for your plant and personnel?

MOCO has long given careful consideration to all of these factors—and countless others. Engineering to your specific product requirements is always "the starting point."

When you are considering the purchase of a finishing system—why not consult with a qualified MOCO engineer and learn more about MOCO *Integrated* Finishing Systems.

Here's Valuable Information

This interesting bulletin on MOCO systems is yours for the asking. Why not write today?



FINISHING DIVISION

MICHIGAN OVEN COMPANY

411 BRAINARD, DETROIT 1, MICHIGAN

Finishing Ovens • Dry-off Ovens • Washing Machines • Dip Tanks • Spray Booths • Bonderizing Units • Flo-coaters • Conveyors

RHEEM EMPLOYEES WIN ALL-EXPENSE WEEKEND TRIP

Two research and development engineers in the Home Prdoucts division, Rheem Manufacturing Co., Chicago, and their wives will enjoy an all-expense weekend at a choice Wisconsin summer resort, due to their outstanding contributions to their respective product sections, progress of the division, and to their own advancement. Daniel A. Lawson, chief design engineer in heating research, and Curtis M. Lee, manager, water heater laboratory, were presented the awards by Lyttleton Price, Jr., director of research and development, following announcement of the annual award by Vearl J. Heinis, vice president and general manager of Rheem. The presentations were made at a special dinner for the occasion, and the awards also provide a special sum of money to be spent by the wives for frivolities.

Daniel Lawson and Curtis Lee consult a Wisconsin road map in anticipation of an all-expense weekend trip to a summer resort which they won as a result of being voted outstanding in the research and development staff for having contributed to their respective product sections, the company, and to themselves.

MARCH TELEVISION OUTPUT UP; QUARTER SALES TOP PRODUCTION

Television production and sales in March increased substantially over February, and cumulative sales during the first three months of this year were reported to be above production by nearly one quarter million receivers, the Radio-Electronics-Television Manufacturers' Association announced.

TV output in March totaled 559,842 receivers, compared with 464,697 TVs made in February. Cumulative television sales totaled 1,682,911 this year as against the 1,689,178 sold in the corresponding quarter of 1956.

Concurrently, production and sales of radio receivers in March increased substantially over the February level, RETMA also announced. Cumulative output and sales were recorded above the first quarter of last year.

Cumulative output figures show 3,959,367 radios produced this year, compared with 3,532,243 made at this time last year.

WHIRLPOOL NEW MEMBER OF KITCHEN CABINET ASSOCIATION

The admission of Whirlpool Corp., St. Joseph, Mich., to full membership in the Steel Kitchen Cabinet Manufacturers Association has been announced by Arthur J. Tuscany, Jr., executive secretary-treasurer.

The new member is marketing two complete lines of steel kitchen cabinets, as well as two disposers and two dishwashers, to complement the full line of Whirlpool appliances.

Charles A. Reinbolt, Jr., general manager of the Kitchen division of Whirlpool, will represent his company in the association.

RESEARCH—$6 BILLION INDUSTRY

Industrial research has become one of the nation's largest businesses, amounting to 1½ per cent of the gross national product, it was pointed out by E. Duer Reeves, executive vice president of the Esso Research and Engineering Co., before the National Industrial Research Conference. He said that industrial research is growing at the rate of some 12 per cent a year.

Speaking of "Research is a Business" at a two-day conference sponsored by Armour Research Foundation of Illinois Institute of Technology, Reeves said that since 1930 research has grown from a $300 million-$400 million activity to a $6 billion industry employing over 500,000 people.

DESIGN FOR SHOWER BATH HEAD WINS $500 REDESIGN AWARD

The director and superintendent of the tool, die, and engineering department of a Cleveland, Ohio, manufacturing company received the 1957 John Woodman Higgins Redesign Award at a luncheon of the Pressed Metal Institute at Hotel Carter, Cleveland, March 8.

The $500 prize, annually donated by the Worcester Pressed Steel Co., Worcester, Mass., was won by Ernest J. Urbas of the Guarantee Specialty Manufacturing Co. His re-design of a shower bath head may save as much as $25,000 a year. (For the complete story of the Higgins Award read "Higgins Redesign Award Openings For 1957 Announced," page 67 in the December, 1956 issue of *finish*, now MPM.)

NORGE PRODUCTION UP 49%; TO REACH 88% GAIN IN QUARTER

Production schedules of Norge are 49 per cent higher than at the same time last year.

Judson S. Sayre, president of this division of Borg-Warner Corp., Chicago, added that manufacturing plans for the second quarter are 88 per cent ahead of 1956 levels at three plants.

"We've scheduled production of 74 per cent more refrigerators and freezers than last year for the Muskegon Heights, Mich., plant during this period; more than four times as many electric and gas ranges and automatic clothes dryers at our Effingham, Ill., factory; and 60 per cent more wringer and automatic washers for our Herrin, Ill., plant."

EMERSON ELECTRIC TO BUY CALIFORNIA FAN MANUFACTURER

Emerson Electric Manufacturing Co. has completed an agreement to purchase Pryne & Co., Inc., Pomona, California manufacturer of ventilator fans, recessed lights and infra-red heaters. The announcement was made by W. R. Persons, president of Emerson and Ralph Pryne, chairman of Pryne.

Pryne employs 400 in leased plants in Pomona and Keyser, W. Va. The firm also has a subsidiary in Toronto.

GULTON INDUSTRIES LOOKS TO THE FUTURE

The ceramic coating department of Gulton Industries was established to do basic and applied research, conduct development programs, and provide production facilities for ceramic coatings for industry and the military.

Through a cooperative arrangement with Lithium Corporation of America, a number of specialized projects are included in the company's program. Among these are, (1) incorporation of chemically pre-compounded lithium compounds in aluminum enamels for electromechanical and electronic applications; (2) high temperature corrosion-resistant ceramic coatings; and (3) heat and corrosion-resistant coatings on light metals, alloys and molybdenum metals, plus electrical insulating coatings and others.

According to information from Paul A. Huppert, director of ceramic coating department at Gulton, future programs will include a study of electrical semi-conductivity, ceramic seals, coating of titanium metal, high temperature protection of heat-exposed parts such as rocket nozzles, and application of photosensitive films on ceramic surfaces.

The company's laboratories are located at Metuchen, N. J.

CHEAPER ACID SOLUTION SUGGESTION SYSTEM PAY-OFF

Airtemp worker George E. Sharpe received a nice pre-Easter nest egg recently. Consisting of defense bonds and cash worth $1,417.32, the nest-egg was presented by R. J. Schumann, company vice-president of manufacturing. Sharpe, a second shift maintenance department plumber, won the tidy sum with a suggestion idea.

He submitted a suggestion to make use of a cheaper acid solution that would do a better job of servicing factory pickling tanks and require fewer tank changes per year. The idea came to him while he was working in his hobby shop at home where he uses different types of acids for cleaning radiators and repairing batteries. A 30-day test period proved that his idea was practical and that it offered definite advantages over the old method, the company reported.

Sharpe's award is the largest won by an employee since Airtemp recently initiated its new suggestion program. Suggestions awards, so far this year, have been averaging $84.59.

CLARENCE HAMILTON HEADS HOUSEWARES MANUFACTURERS

Clarence O. Hamilton, executive vice president of the Hamilton Manufacturing Corp., Columbus, Ind., was elected president of the National Housewares Manufacturers Association by the board of directors at a recent Chicago meeting. He was formerly treasurer of NHMA.

Other officers elected were: W. H. Sahloff, vice president of the General Electric Co., Housewares and Radio Receiver division, Bridgeport, Conn., NHMA vice president; and G. C. Kubitz, vice president in charge of sales, Aluminum Goods Manufacturing Co. Manitowoc, Wis., treasurer. Dolph Zapfel was reappointed NHMA secretary.

Elected directors were: B. C. Neece, president of Landers, Frary & Clark, New Britain, Conn.; L. C. Nelson, presi-

ACTIVATED CLEANING
breaks phosphatizing bottleneck
Hey, Joe, these door panels need two coats of paint. What's wrong?
Can't control the phosphate coating weight—crystals are too big. We'll hand rub the next few panels.
Hi, Jim, get me out of this jam. We need a uniform, lightweight zinc phosphate coating.
You're talking my language, Joe. Ever hear of Pennsalt activated cleaning and Fosbond?
In your normal cycle, and with no hand rubbing, Pennsalt activated cleaning gives you a refined, lightweight Fosbond coating.
"But how does Pennsalt know so much about phosphate coating? It's a pretty new field."
"We called on our wide knowledge of all phases of metal surface preparation—cleaning, surface-activation, and phosphatizing . . . Don't forget, nobody knows more about metal-processing chemistry than Pennsalt."
A MONTH LATER ...

dent of The Cal-Dak Co., San Gabriel, Calif.; and H. J. McCormick, general sales manager of Revere Copper and Brass. Two other new directors are: Charles Briddell, president of Chas. D. Briddell, Inc., Crisfield, Md.; and Harry Schwartz, vice president of Lincoln Metal Products Co., Brooklyn, N. Y.

The Board elected as members of the NHMA Executive committee Hamilton, Sahloff, Kubitz, and H. C. Forster, vice president, Ekco Products Co., Chicago.

Zapfel reported to the directors that 615 exhibitors, a new summer show record, have been assigned all available space in the 27th NHMA National Housewares Exhibit to be held in Atlantic City July 8-12. He said that almost 170,000 square feet of net exhibit space will be used in the huge auditorium.

NORGE REFRIGERATOR, FREEZER SALES UP 14% IN FIRST QUARTER

Factory sales of Norge refrigerators and home freezers during January, February, and March were up 14 per cent over the corresponding 1956 period.

Harold P. Bull, vice president in charge of distribution for Norge division, Borg-Warner Corp., said that accelerated demand has required Norge to set up a second shift at its Muskegon Heights refrigerator-freezer plant.

SKCMA ANNUAL MEETING AT GREENBRIER JUNE 14-16

The Steel Kitchen Cabinet Manufacturers' Association will meet at the Greenbriar, White Sulphur Springs, W. Va., June 14-16.

R. A. MacNeille, president of the association, said that the Sales Promotion committee and the entire membership will be asked to review and implement a full-scale national promotion program designed to increase the impact of steel kitchen cabinets on the consumer.

The technical committee, headed by Paul Vignos of the Berger division of Republic Steel Corp., will discuss and draw up the association recommendations with respect to proposed revisions in the minimum property requirements of FHA.

New officers are to be elected and committee personnel selected. SKCMA says that this will be the initial meeting for four new association members including Whirlpool, Just Manufacturing, Nutone, and Formica Corp.

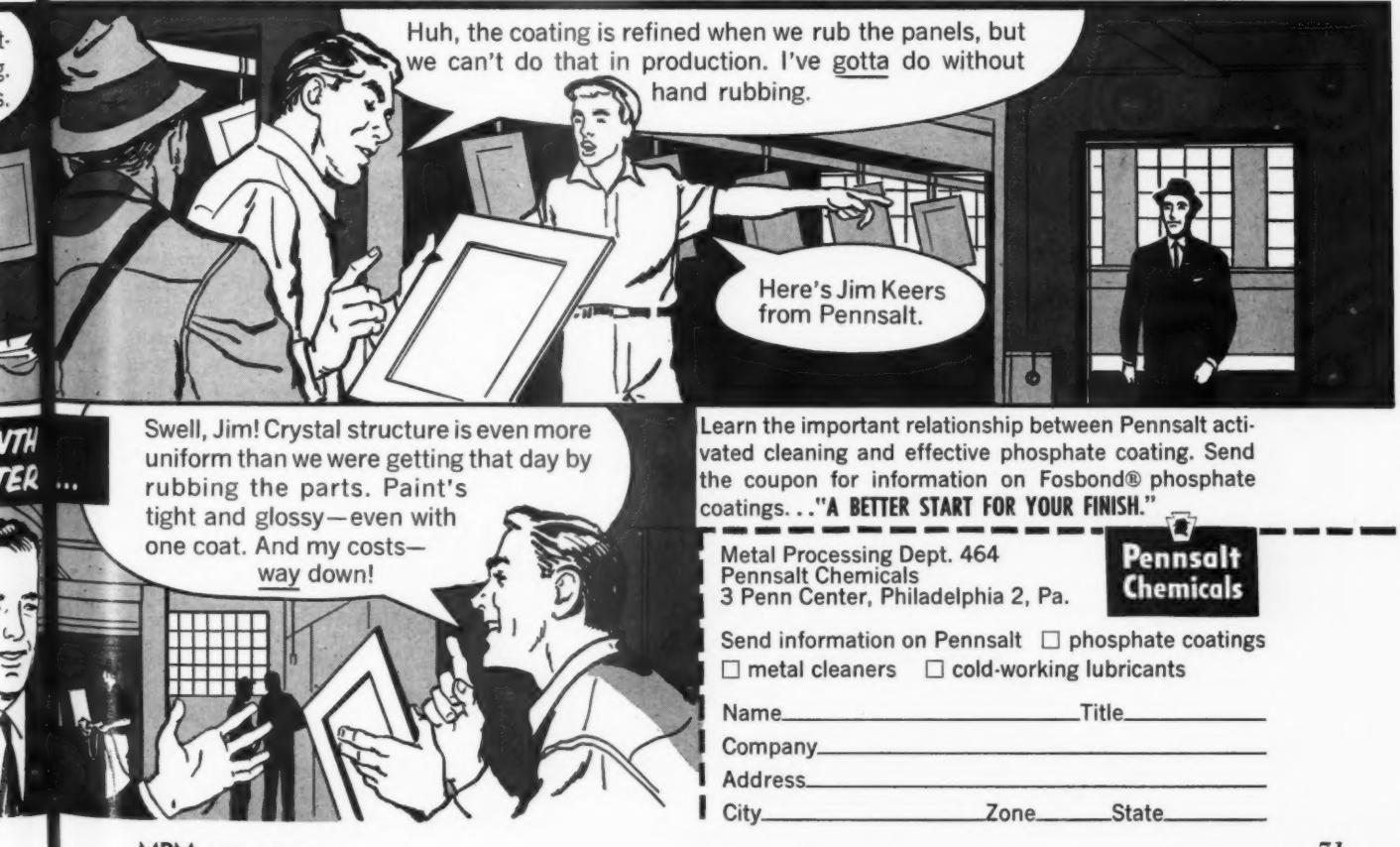
Arthur J. Tuscany, Jr., executive secretary of the association, said the meeting schedule calls for a full day of committee and board meetings on Friday (14th) followed by a reception. The general business meeting and the annual banquet will be Saturday. Don Barber, of the Geneva Modern Kitchens division, Acme Steel Co., will be toastmaster at the banquet.

NEMA REPORTS INDUSTRY SALES OF ELECTRICAL APPLIANCES

Unit major electrical household appliance sales for January, 1957, as reported by the National Electrical Manufacturers' Assn., are as follows: Electric Household Refrigerators, 305,400; Electric Farm and Home Freezers, (includes chest and upright models) 68,400; Electric Ranges, (over 2½ KW) Standard Electric Ranges, 116,600, Electric Built-in Ranges (includes sales of built-in ovens and electronic ranges) 27,900, Total Electric Ranges, 144,500; Electric Storage Water Heaters, 56,300; Electric Dishwashers, (includes motor-driven types only. Excludes miniature or drainbroad types.) 37,200; and Electric Food Waste Disposers, (plumbed-in units only) 49,800.

VACUUM CLEANER FACTORY SALES UP IN MARCH

Factory sales of standard-size household vacuum cleaners in March totalled 312,746 units, an advance of 3.9 per cent over 300,887 in February, second


Huh, the coating is refined when we rub the panels, but we can't do that in production. I've gotta do without hand rubbing.
Here's Jim Keers from Pennsalt.
Swell, Jim! Crystal structure is even more uniform than we were getting that day by rubbing the parts. Paint's tight and glossy—even with one coat. And my costs—way down!

Learn the important relationship between Pennsalt activated cleaning and effective phosphate coating. Send the coupon for information on Fosbond® phosphate coatings..."A BETTER START FOR YOUR FINISH."

Metal Processing Dept. 464
Pennsalt Chemicals
3 Penn Center, Philadelphia 2, Pa.

Pennsalt Chemicals

Send information on Pennsalt ☐ phosphate coatings ☐ metal cleaners ☐ cold-working lubricants

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

highest for that month in the industry's history, according to figures for the industry announced by the Vacuum Cleaner Manufacturers' Association.

Sales for the first three months of 1957 aggregated 890,371 cleaners, down 9.5 per cent from 984,275 units in the opening quarter of 1956.

GAMA REPORTS GAS RANGE & WATER HEATER SHIPMENTS

Manufacturers shipped 162,300 gas ranges in March, or 10.8 per cent fewer than the 181,900 for the same month in 1956, the Gas Appliance Manufacturers' Assn. announced.

Edward R. Martin, GAMA director of marketing and statistics, pointed out that the total excludes built-in units, which have been gaining in both the new housing and home modernization markets.

For the first quarter, 1957 gas range shipments totalled 447,600 units as against 513,800 a year earlier, a 12.9 per cent decline.

Concurrently with the report on gas range shipments, GAMA reports that manufacturers' shipments of automatic gas water heaters in March were 14.4 per cent below the peak level of last year. Shipments totalled 229,100 units in the latest month, as against 267,500 in March, 1956, highest monthly total in last year's record output.

Totals are based on a telegraphic survey among producers.

GE SETS NEW FIRST-QUARTER SALES AND EARNINGS RECORD

General Electric Co. set new first-quarter records in both sales and earnings during the first three months of 1957, President Ralph J. Cordiner announced recently. Sales billed, he said, amounted to $1,048,850,000, an increase of 11 per cent over the previous first-quarter record of $946,458,000 set in 1956, and a 26-per cent increase over the first quarter of 1955.

Cordiner reported net earnings for the quarter of $64,006,000, up 16 per cent over comparable 1956 earnings of $54,962,000 and 22 per cent higher than first-quarter 1955 earnings. The earnings were equivalent to 73 cents per share of common stock and 6.1 cents per dollar of sales, as compared with 63 cents per share and 5.8 cents per sales dollar for first quarter 1956, and 6.3 cents per sales dollar in the first quarter of 1955.

KOREAN LABOR LEADERS VISIT CIRCLE F PLANTS

The Circle F Manufacturing Co., Trenton, N. J., makers of electrical wiring devices, recently played host to three high-ranking Korean labor leaders during their visit to the United States as guests of the U. S. Department of Labor.

The Korean officials were impressed with the modern manufacturing methods employed by Circle F in their plastics division, porcelain division, and the main assembly plant. Interesting to them also were the tool making departments, and the extensive apprenticeship training program carried on by E. J. Gampell, personnel director of the firm.

Korean labor leaders, visiting plants in the U. S. as guests of the Department of Labor, view plant operations at Circle F Manufacturing Co. Left to right are: Tai-chung Kim, assistant chief of the Korean Labor Bureau; Edward A. Ring, Circle F vice president; Gampell; John LaPorta, U. S. Department of Labor representative; Peter Kook-Chan Cha, director of the propaganda department, Federation of Korean Trade Unions; and Mong Yun Han, Chief of the Korean Labor Bureau.

GAS CENTRAL HEAT SHIPMENTS

Manufacturers' shipments of gas-fired equipment for residential central heating were lower in February than during the same month a year earlier, GAMA has announced. Forced warm air and gravity types showed 45,300 units, down 11.2 per cent from 51,000 in February 1956. February shipments of gas-fired boilers, 5,200 units, 3.7 per-cent down from 5,400 in 1956. Conversion burners were down 29.8 per cent from 8,400 in 1956 to 5,900 in February 1957.

HUYCK *FURNISHES FIREBRICK MASONRY TO BUILD, REBUILD AND REPAIR ALL TYPES OF: ENAMELING FURNACES . . . FRIT SMELTERS . . . ALUMINUM, BRASS, LEAD SMELTERS . . . FORGE FURNACES . . . HEAT TREATING FURNACES.*

HUYCK *LINES AND RELINES MILLS*

HUYCK *MASONRY IS GUARANTEED TO GIVE YOU BETTER PERFORMANCE AND LONGER LIFE*

Huyck CONSTRUCTION COMPANY..

1861 DeCook Avenue • Park Ridge, Illinois • TAlcott 3-0612

INDUSTRY PERSONALS

The appointment of *C. D. Alderman* as president, and *Michael L. Ondo* as vice president, sales, of the Youngstown Kitchens division of American-Standard was announced recently.

ALDERMAN

ONDO

Robert H. Schwaig has been appointed sales representative in the St. Louis, Mo., area for The Pfaudler Co., Rochester, N.Y., according to an announcement by H. I. Edwards, general sales manager. Pfaudler is a producer of glassed steel process equipment as well as a major fabricator of alloy dairy, brewery, and process equipment.

James H. Kellogg has been elected president of Charles T. Brandt, Inc., Baltimore, Md., contract manufacturer of steel sheet and metal products, it has been announced by the board of directors. Kellogg succeeds *Charles E. Brandt, Sr.*, who has been named chairman of the board.

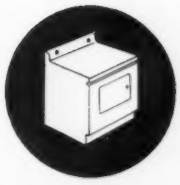
Worthington Corporation, New York, has elected *Walther H. Feldmann* president. He succeeds Edwin J. Schwanhausser, who becomes vice chairman. Hobert C. Ramsey continues as chairman and chief executive officer.

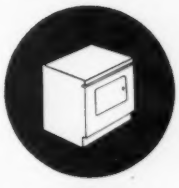
Lewis J. Cox has been elected first vice president and chief executive officer of the Iron Fireman Mfg. Co., Cleveland, Ohio. The action was taken at a special meeting of the directors following the recent death of the firm's president, Wayne F. Strong.

George A. Langenberg has been appointed national product manager in charge of wet heating systems for the Home Products division of Rheem Manufacturing Co., Chicago.

Arnold A. Copeland has been appointed vice president for marketing and merchandising for Falco Products, Inc., Philadelphia, producers of aluminum tables and home laundry equipment.

Let AMICO solve your appliance-casting problems...





. . . with versatile, low-cost malleable castings.

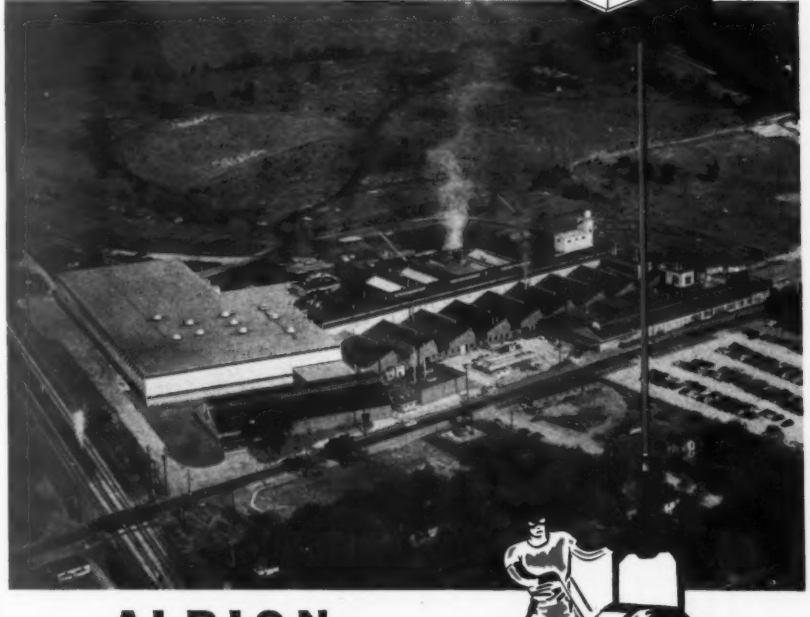
Whether your requirements call for a casting large—or delicate, you can easily slash production, machining and assembly costs because Albion's malleable casting techniques offer a complete freedom of design with the elimination of excess metal and finishing time.

Then, too, Albion's malleable irons (pearlitic and ferritic) afford amazing wear resistance, maximum rigidity, endurance plus exceptionally high yield strength.

Why not review your appliance components and see for yourself just how many places a good, accurate, low-cost casting would improve your production, increase the life-span and overall appeal of your product.

Or—contact the Albion Malleable Iron Co. now. They'll be glad to show you examples of how they can solve your appliance-casting problems and save you time—tools and dollars.

Albion's Research and Development Laboratory facilities and competent engineering staff are ready to assist you.



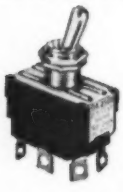
ALBION MALLEABLE IRON CO.

ALBION, MICHIGAN

APPLIANCE SWITCHES

10 Amp. 250 V. A-C
15 Amp. 125 V. A-C [L]
¾ H.P.-120-240 V. A-C

L-52-P



D.P.D.T. • on-off-on • Solder Lugs

10 Amp. 250 V. A-C
15 Amp. 125 V. A-C [L]
¾ H.P.-120-240 V. A-C

L-50-N

D.P.D.T. • on-on • Screw Terminals

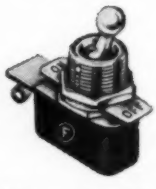
15 A—125 V. A-C
10 A—250 V. A-C
¾ H.P.-120 Volts A-C
1½ H.P.-240 Volts A-C

2230

S.P.S.T. • on-off • Screw Terminals

3 A—125 V. [T]
6 A—125 V.
3 A—250 V.

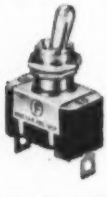
1887-LP



S.P.S.T. • on-off • Solder Lugs

10 Amp. 250 V. A-C
15 Amp. 125 V. A-C [L]
¾ H.P.-120-240 V. A-C

L-42-E



S.P.D.T. • on-off-on • Solder Lugs

10 Amp. 250 V. A-C
15 Amp. 125 V. A-C [L]
¾ H.P.-120-240 V. A-C

L-40-A

S.P.S.T. • on-off • Screw Terminals

¾ Amp. 125 V. D-C
3 Amp. 125 V. A-C
6 Amp. 24 V. D-C

K-10-A

S.P.S.T. • on-off • Screw Terminals

10 Amp. 24 V. D-C
3 Amp. 125 V. A-C

L-20-E

S.P.D.T. • on-off-on • Screw Terminals

CIRCLE F MFG., CO.

TRENTON 4, NEW JERSEY

53rd Year

Mel E. Maurer has joined A. B. Dick Co., Chicago, manufacturer of duplicating equipment and supplies, as vice president-manufacturing. Prior to his appointment, he was president of the Flex-O-Tube division of the Meridan Corp.

Westinghouse Electric Corp., Columbus, Ohio, has expanded its headquarters refrigerator-freezer department, adding new personnel and changing some assignments, according to W. R. Arbuckle, manager of the department.

The new departmental organization is: *C. J. Vondran*, merchandise manager of refrigerators; *C. J. Kenny*, merchandise manager of freezers; *A. E. Nave*, manager of productive planning; *E. H. vanGuelpen*, manager of sales training for refrigerators and freezers; *R. R. Burkholder*, advertising supervisor; and *G. W. Erdmann, Jr.* and *C. Brüch*, assistants to the department manager.

VONDRAN

NAVE

Paul Eberhardt has joined Revco, Inc. as cabinet engineer. Eberhardt comes to Revco from RCA Whirlpool, Evansville, Ind. Eberhardt will fill the position formerly held by *Howard Tenniswood* who was recently elevated to a new position in charge of long range development. Edward Von Arb is director of engineering and Clare Kafer, Chief cabinet engineer.

Fred L. Brewer has been named assistant to the director of purchases at A. O. Smith Corp., Milwaukee, Wis.

Aaron R. Campbell has been promoted to superintendent of electronic and experimental airframe fabrications for Temco Aircraft Corp., Dallas, Texas.

Orval D. Berry has been elected a vice president of Iron Fireman Manufacturing Co. He has been manager of the company's Electronics division for over a year, having joined the company as assistant manager in 1955. *R. K. Handley* was also named a vice president of the firm.

Paul I. Berno, recently named treasurer of the Tappan Stove Co., Mansfield, O., was elected a vice-president of the company at the board of directors meeting recently.

H. A. Sperlich was named president of Ironrite, Inc., Mt. Clemens, Mich., following the resignation of W. R. Dabney. Sperling will continue as chairman of the firm.

Leonard W. Smith has been appointed director of sales planning for Norge Div., Borg-Warner Corp., a new position.

James H. Werning, has been named general director, product engineering, die engineering, process development, and production engineering; *Bart Cotter* has been named chief engineer; and *Robert M. McVeigh* has been named assistant chief engineer at Fisher Body Div., General Motors, Detroit.

National Research Corp. has announced the promotion of *Milo P. Hnilicka* to the position of Engineering Associate.

G. W. Mallatratt, New York City, was elected a director of Rheem Mfg. Co., at its annual meeting in Richmond, Calif. Shareholders returned the entire management slate which included *A. Lightfoot Walker,* who was elected president and chief executive officer last September, succeeding *R. S. Rheem,* who became chairman of the board.

Patrick N. Morgan has been named assistant to the vice president and general sales manager, Heater and Tank Div., John Wood Co., Conshohocken, Pa.

MALLATRATT

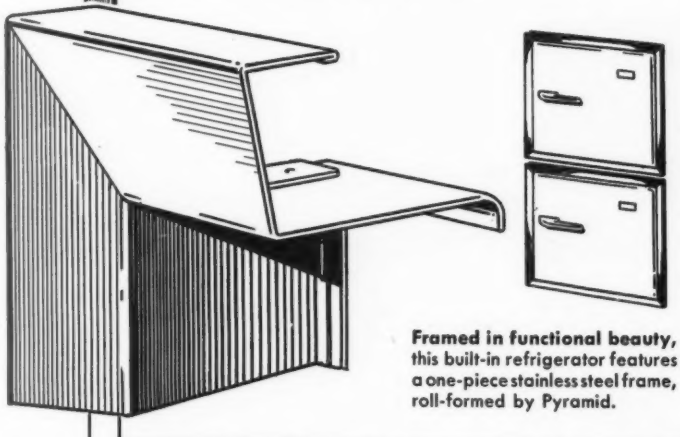
MORGAN

Neele E. Stearns, president of Crane Co. since Jan. 1, has been elected to the firm's board of directors. The action took place recently at the company's annual meeting of shareholders at its general office, 836 S. Michigan Ave., Chicago.

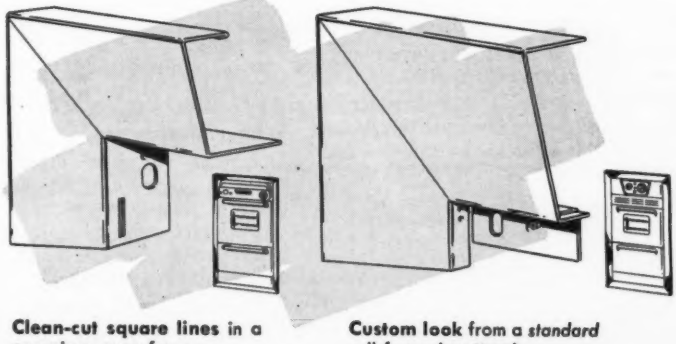
"SQUARE OFF" FOR SALES!

with PYRAMID MOULDINGS

You, too, can achieve the much-wanted "square look" in free-standing or built-in appliances—*with little or no tool cost!* Pyramid offers *standard designs* roll-formed from stainless steel . . . or *custom designs* created at surprisingly low cost, thanks to the economies inherent in the roll-forming process. Whether your need is for square types, round or straightaway—when it comes to metal mouldings, come to Pyramid, specialists in roll-forming for 30 years!



Framed in functional beauty, this built-in refrigerator features a one-piece stainless steel frame, roll-formed by Pyramid.



Clean-cut square lines in a one-piece oven frame.

Custom look from a *standard* roll-formed pattern!

Write Today for Your Free "Plan Book of Metal Mouldings"

Pyramid Mouldings Inc.

5365 WEST ARMSTRONG AVE., CHICAGO 30, ILL.

NEW YORK...CALIFORNIA

Readers approve new publication name

a more descriptive name

Mr. Jones has called George Mills' and my attention to the preprint of an editorial to appear in your February issue, as well as the four-page reprint covering the evolution of the cover and title of "Metal Products Manufacturing" (nee Finish). All of us here at ARI think that the new cover design, as well as the new title, are excellent. As you will recall, we discussed the need for a more descriptive name for the publication when you were in Washington late in 1956.

In giving our complete "approval" to your new name and cover page, may we express the wish that MPM under its new masthead will continue to show the same progress in its broad field that has marked the 13 years of service it has already chalked up under the old name — "Finish." We hope, in short, that the end of "Finish" is the beginning of a new era of service and reporting for MPM.

Ted Kellogg
Dept. of Public Relations
Air-Conditioning and
Refrigeration Institute
Washington, D. C.

distinctly advantageous move

Thanks for your letter of January 22nd which enclosed the preprint of an editorial which will appear in your February issue.

It seems to me that you have made a distinctly advantageous move here; congratulations.

Continued best wishes for the success of your publication under the new banner.

Harold Massey,
Managing Director
Gas Appliance Manufacturers Association
New York, New York

better identifies magazine

Thanks for the preprint of your editorial and the interesting evolution of your cover. I think it is a great improvement and better identifies your magazine with the appliance and metal products industry.

Louis Fisher — Director
Trade Sales Division
Nat'l Paint, Varnish and
Lacquer Assn., Inc.
Washington, D. C.

ever changing — always better

The ever changing and always better Metal Products Manufacturing is at hand. We very much appreciate selection of Revco Bilt-Ins as a subject for MPM Spotlight in the February issue.

Congratulations on the growth and expanding service of the Dana Chase Publications.

H. C. Beresford
Revco, Inc.
Director of Advertising
and Merchandising
Deerfield, Michigan

old name would have to go

I have just noticed the new title and format of your publication on Metal Products Manufacturing to replace Finish, and I want to congratulate you on this important change.

While the term "Finish" was appropriate when the publication was started, as it grew and the editorial pattern became more definitely established, it was obvious that the old name would have to go in favor of one that is more descriptive of the type of material you present.

As I have told you on many occasions, I think you have been doing an excellent job with this publication. It seems that each issue shows a definite measure of improvement.

Congratulations to you and all your staff for the fine job you are doing, and my very best wishes for your continued success.

R. A. Dadisman
Director of Market
Development
Armco Steel Corporation
Middletown, Ohio

a big step forward

I think you have taken a big step forward in changing the name of your book to METAL PRODUCTS MANUFACTURING which . . . is more in keeping with your broad editorial content than the former name of "Finish".

It seems to me that the real significance of a book is not the name as much as the people and publisher that stand behind it. If they have the knowledge of whom their advertisers want to reach and what their readers want to read, the success or failure of the magazine comes from how the two are put together. Simple — isn't it?

John R. McCord
Director—Public Relations
and Advertising
Ferro Corporation
Cleveland, Ohio

now you have both . . .

Congratulations! Your new cover format and name is excellent — and should do a deeper penetration job for you.

Up until I analyzed Finish for Southeran Screw, your front cover had all the outward appearance of a trade paper in the furniture field.

I am always happy to see a good book possess a good name. Now you have both!

Charles E. Gressle
Ayer and Gillett Advertising
Charlotte, North Carolina

more definitive title

I have noticed your new name change with the note that "no changes in editorial or circulation policy are planned."

I do believe, however, that the broadened and more definitive title will be reflected in a broader advertising market over the years ahead.

Hal Burnett, President
Burnett & Logan, Inc.
Chicago, Illinois

excellent choice for title

It is our feeling that METAL PRODUCTS MANUFACTURING is an excellent choice for the title of a publication covering the various subjects which you advertise, publicize and cover editorially . . .

We wish you the best of success with your new name . . .

George S. Forbes
Industrial Sales Manager
The Glidden Company
Cleveland, Ohio

a real improvement

Congratulations on the new name for Finish; I consider this a real improvement.

Any publication with a name that "has to be explained" loses valuable time in explaining its purpose and every lost motion costs money.

My best wishes for continuing success under the new name.

G. Gordon Hertslet
Manager Sales Promotion
Gaylord Container Corp.
St. Louis, Missouri

more descriptive name

I believe your name is very good and certainly more descriptive of your publication. I think you and your organization have done an outstanding job and you have my best wishes for your continued success.

John Tuthill
General Manager of Sales
The Youngstown Sheet and
Tube Company
Youngstown, Ohio

most powerful medium

The idea appeals to me. MPM could also stand for Most Powerful Medium!

These comments are typical of the many received by MPM *editors since our change in name — they are greatly appreciated by the MPM staff.*

NO. 3 OF A SERIES

Idea!

tape recorder

using H&K perforated metals

In the tape recorder illustrated, perforated metal by Harrington & King has been utilized in combination with insulated injection molded plastic for richness as well as functional sensibility. Harrington & King perforated metals have long been selected whenever a durable yet permeable surface is required for sound transmission. H & K perforated materials provide the Industrial Designer and other men of ideas unlimited opportunities to offer both functional and aesthetic properties as demanded in products for today's market.

H & K engineers will be pleased to work with you on your requirements

The design, pattern and open area for almost every application may be selected from our thousands of perforating dies . . . at no charge for tooling. (If a special design is required, tools will be built to order.)

Harrington & King can perforate practically any material that can be obtained in coils, sheets or plates . . . from foil-thin to 1" thick. Metallic materials—steel, aluminum, stainless steel, brass, copper, monel, zinc, bronze, etc. Non-metallic materials—plastics, wood composition, paper, cloth, etc.

Fill in and mail coupon to nearest H & K office.

* Product Development by William M. Schmidt Associates

THE Harrington & King PERFORATING CO. INC.

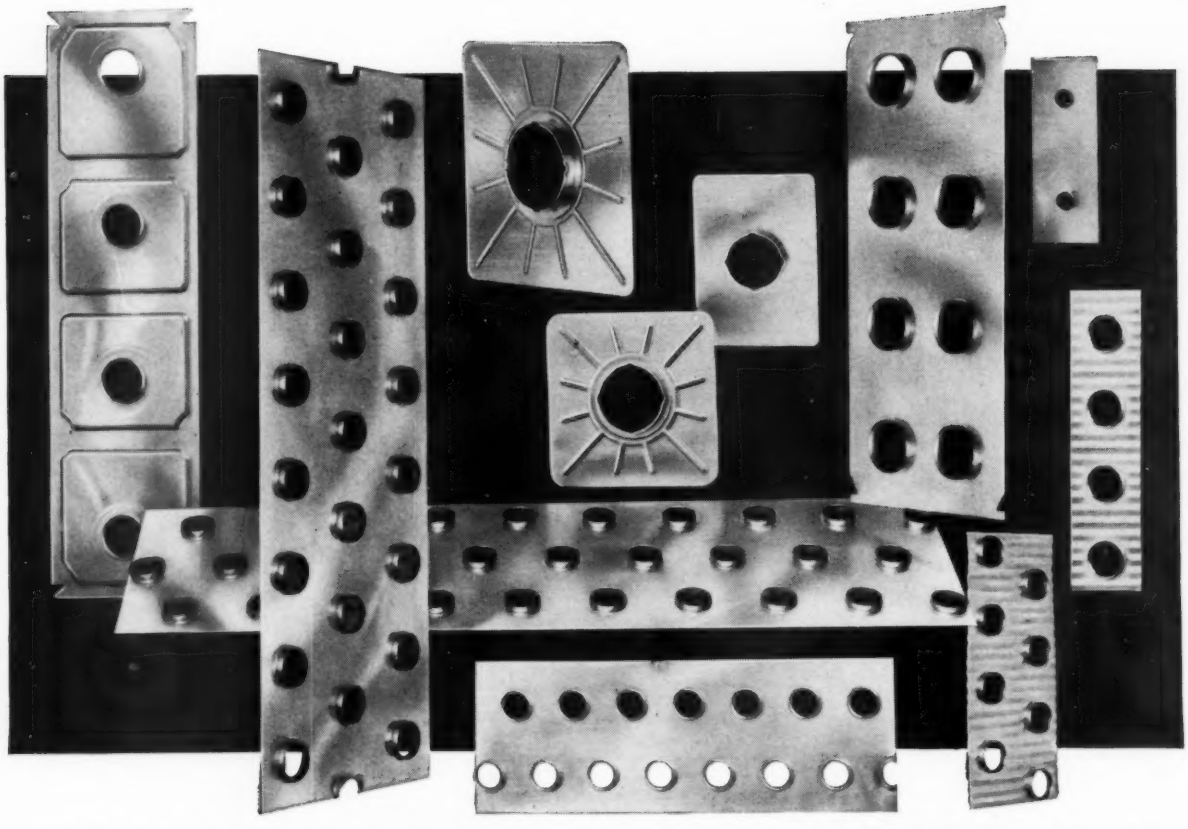
Chicago Office and Warehouse
5640 Fillmore Street
Chicago 44, Ill.

New York Office and Warehouse
116 Liberty Street
New York, N.Y.

Please send me—

☐ GENERAL CATALOG NO. 62
☐ STOCK LIST of Perforated Steel Sheets

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____



YOU GET MAXIMUM DESIGN LATITUDE WITH

FAIRMONT ALUMINUM

For perfection in the formation of fin collars, to assure excellent mechanical and thermal bonding to tubing, ***EMBASSY*** uses wrought aluminum 1100 alloy, .010″ thick, made by Fairmont.

Baseboard heater section made by ***EMBASSY STEEL PRODUCTS, INC.***, Brooklyn 8, New York, employs 60 die-formed fins per foot made of Fairmont aluminum.

To meet widely differing specifications in the manufacture of heat-transfer surfaces such factors as size, shape, thickness, perforation and spacing of fins are given proper evaluation by design engineers. Of equal importance is the aluminum fin's ability to withstand rapid mechanical forming in production and assembly without developing cracks or buckling, its ability in service to withstand temperature, moisture and mechanical attacks.

With an enviable reputation for rigid quality control and specialized attention to manufacturers' requirements for uniform wrought aluminum alloy 1100 and 3003 sheets and coils, Fairmont enjoys the continuing preference of foremost heat-transfer surface manufacturers. Write or call today for details.

Sales offices in principal cities

FAIRMONT ALUMINUM COMPANY

SUBSIDIARY OF **CERRO DE PASCO CORPORATION**

Dept. P-1 • FAIRMONT, WEST VIRGINIA

FALCO

Patricia Hughes and Mr. Hughes are welcomed at Midway airport, Chicago by Mr. & Mrs. Dana Chase. The foursome motored to French Lick Springs for the AHLMA *meeting.*

METRO NEWS PHOTO

Home Laundry Queen for 1957 at the AHLMA meeting

During 1956 this publication sponsored a contest for the selection of a Home Laundry Queen. The contest was open to all members of the home laundry appliance industry, and was based on the selection by MPM editors of a suitable queen from photographs entered by individual manufacturers.

The selection of a Home Laundry Queen for 1957 placed Patricia Hughes of Buffalo, N.Y., in first position. The photograph by Sherwin Greenberg was entered by Easy Washing Machine Div., Murray Corp.

Patricia Hughes, a housewife and the mother of two children, is a professional model. At the ripe age of 22 she is a logical exponent of modern living through the use of modern labor saving appliances.

As an acknowledgement of the ascension to the throne, Mr. and Mrs. Hughes were invited to visit French Lick, Indiana, during the AHLMA convention as guests of METAL PRODUCTS MANUFACTUR-

to next page →

Here is a reproduction of a section of the photo which won MPM*'s home laundry queen contest for the Easy entrant. The complete photo appeared originally in the 10th annual special home laundry section.* SHERWIN GREENBERG PHOTO

The queen receives roses and a silver crown from Arnold Ver Lee, manager, dryer sales, Easy Washing Machine Div., Murray Corp. of America, who represented Easy at the MPM *reception for Patricia Hughes.*

MPM PHOTO

Left: The twenty-two year old Mrs. Home Laundry Queen enjoys her roses and her crown.

PHOTO BY ROSE PHOTOGRAPHERS

Mrs. Guenther Baumgart, the queen, and Mr Baumgart at the MPM *reception. Mr. Baumgart is Executive Director of the American Home Laundry Association.*

MPM PHOTO

INC. At French Lick it was observed that Mr. and Mrs. Hughes enjoy riding, and ride with poise in keeping with their respective qualifications as model and senior engineering student.

At a cocktail party and reception for the Queen at the French Lick-Sheraton hotel, attended by practically all who were at the home laundry meeting, Arnold Ver Lee, manager of dryer sales and Easy's representative at the AHLMA convention, presented Mrs. Hughes with a beautiful bouquet of red roses and a silver crown as a token of appreciation and a congratulatory expression for her having won the contest under the Easy banner.

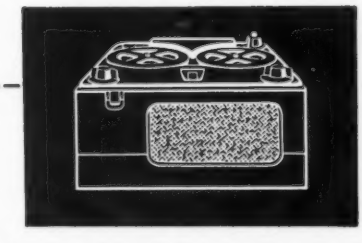
Plans for a renewal of the contest to select a Queen for 1958 have not been finalized, but if interest among the manufacturers continues at a high pitch, it is expected that the idea may become an annual feature of METAL PRODUCTS MANUFACTURING.

MACCO BLU-COAT

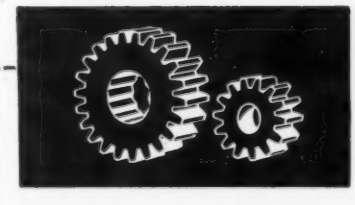
– the ideal between-operation rust proofing solution –

PREVENTS RUST

RECORDER precision parts are being given the Macco Blucoat Rust Preventive treatment by one of the nation's leading electronic manufacturers.



GEARS, cut, ground and tempered, are treated with Blucoat to prevent rust during storage, shipping, and assembly.



CARBURETOR bodies and large engine castings being treated with Macco Blucoat to prevent rust after machining and during storage.

AUTO bodies of some of the world's largest body manufacturers are given the Blucoat treatment to prevent rust after drawing or machining.

5 Reasons for
BLUCOAT'S NATIONAL ACCEPTANCE

Macco Blucoat is the amazingly efficient rust preventive used by leading metal processors and fabricating manufacturers everywhere. Endorsed as the only practical method of preventing rust between production operations and assembly—and during transportation and storage.

1. Water soluble—economical, yet extremely efficient.
2. Adaptable to an almost unlimited variety of applications and conditions.
3. Works equally well on steel, cast iron, forgings or die castings.
4. Leaves no oily film. Assures better adhesion. Collects less dust, chips, etc.
5. Blucoat has withstood perfectly a salt spray test of more than 80 hours. Vastly superior to soluble oil. Non-poisonous. No alcohol. Extremely stable.

For the prevention of rust, Blucoat positively has no equal. Whether for the finest of automobile bodies or simply bale tie-wires, Blucoat's versatility makes it most indispensable for any processing plant.

Write today or call a Macco sales engineer

MACCO PRODUCTS COMPANY

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NEWS about Suppliers

L. R. KERNS OPENS KERNS PACIFIC CORPORATION

The L. R. Kerns Company of Chicago has announced the opening of Kerns Pacific Corporation, a wholly owned subsidiary located in Orange, California.

The report states that Kerns Pacific, like the Chicago parent organization, will produce industrial metal processing compounds and specialized chemical products. It was formed to serve industry in California, Washington, Oregon, Arizona, Nevada, Utah and Idaho. Annual output of the West Coast plant is rated at approximately twenty million pounds. In addition to manufacturing facilities, the new building houses a chemical laboratory for production control and research and West Coast general and sales offices.

Kerns Pacific management organization is headed by Arnold F. Kluender, vice president in charge of operations, and A. L. Spalding, vice president in charge of sales.

NEW FERRO ENGINEERING CENTER COMPLETED

This exterior view of the new Ferro Engineering Center shows the use of porcelain enameled curtain wall construction, combined with heat-absorbing glass and aluminum extrusions on the face, and glazed brick for side elevation. North and South walls are faced with light warm-gray glazed brick.

Ferro Corporation has completed a new Engineering Center, near the site of its Cleveland plant, which houses the Allied & Furnace Engineering Divisions, designers and builders of furnaces and equipment for the porcelain enameling and ceramic industries. The new multistory building contains 16,000 square feet of floor space.

The Center is situated on sloping ground, revealing a two-story and three-story structure respectively on the high and low sides of the grade. The short elevations are of glazed brick masonry construction. Porcelain enameled steel curtain wall construction was used extensively in order to use Ferro products, including porcelain enamel and inorganic colors.

The building itself is of structural steel framing, incorporating open web bar joists for support of floors and roof. Two walls are constructed of aluminum extrusions forming mullions and rails which frame heat absorbing glass and the porcelain enameled steel, double walled insulation spandrel panels. The panels are finished in three shades of turquoise.

Interior walls are faced with light turquoise porcelain enameled steel "Mirawal". Movable partitions are used.

The Engineering Center was designed by Fred W. Schlensker (Ferro employee) in collaboration with Edmond V. Prociak, professional engineer. General contractors were Paugh & Brown, Inc., Cleveland, Ohio.

PEMCO LEVELS GROUND FOR RESEARCH BUILDING

Leveling of a site east of the main plant of Pemco Corp., Baltimore, has been completed and the foundation is being laid, according to a progress report issued by Herbert Turk, executive vice president.

The new building will cover an area the size of a city square, and will have three times the floor space of the present laboratories, which are located away from the main plant. The Baltimore company was a pioneer in the application of research and precise methods to the manufacture and application of porcelain enamel.

STAUFFER CHEMICAL EXPANDS CALIFORNIA LABORATORY

Stauffer Chemical Company has begun construction on a major addition to its research laboratories at Richmond, Calif. It is anticipated that the extension, which will cost several hundred thousand dollars, will be completed by early fall.

The major reason for undertaking the expansion project, according to Dr. Chester L. Arnold, Stauffer's vice president, research, is to provide additional facilities for the company's extensive research activities in the development of special metals, high energy chemical fuels, and new inorganic plastics.

CORNING'S LILLIS SPEAKS BEFORE ACS STUDENT BRANCH

Howard Lillis, manager of fundamental research, Corning Glass Works, Corning, N. Y., and past president of the American Ceramic Society, spoke at the recent meeting of the Student Branch of the Society at the University of Illinois.

Lillis spoke on the development of glass at Corning. He showed a color movie on the contributions of glass to art, the sciences, industry, and world civilization.

REYNOLDS PREDICTS RISE IN ALUMINUM SALES OVER '56

Reynolds Metals Co., Richmond, Va., expects 1957 sales and earnings to surpass the $41.2 million reported in 1956, according to a statement made recently at the company's annual stockholder meeting by R. S. Reynolds, Jr., president.

Reynolds told the stockholders that estimated first quarter earnings will be about $10 million. Comparable earnings were $11.6 million for the same 1956 quarter, and $9.8 million in the last quarter of 1956. He pointed out that a non-recurring gain of $1.5 million increased the 1956 first quarter net to $13.1 million. Reynolds further added that there is a strong indication that the market for aluminum will strengthen substantially during the months ahead.

MARCH SHIPMENTS OF WELDING EQUIPMENT SHOW INCREASE

Statistics compiled by the Resistance Welder Manufacturers' Association for the month of March indicate that shipments for that month have increased nearly 40 per cent over February shipments. March shipments again considerably exceeded $3 million, making this the seventh month out of the last nine when this figure has been reached.

Members continue to report a high backlog — nearly $13½ million at the end of March.

UNITED WALLPAPER OPENS NEW EXECUTIVE OFFICES

United Wallpaper, Inc., announces the opening of its new executive offices at 1350 S. Kostner Ave., Chicago. These offices adjoin United's Central Research laboratories, which were formally opened in December, 1955.

S. U. Greenberg, firm president, states that there will be no formal open house ceremonies; however, customers and friends from the industry are invited to tour the new facilities. The central location of the new executive offices will facilitate the coordination of the entire United Wallpaper, Inc., organization, it is reported, with nine paint, resin, and wallpaper plants located throughout the U. S.

MASON-NEILAN EXPANDS

A new post of general sales manager and three new regional sales headquarters have been established by Mason-Neilan, division of Worthington Corp., according to an announcement by Mr. Carl W. Gram, Jr., vice president.

Mason-Neilan is a leading manufacturer of control valves, instruments, regulators, level transmitters, automatic tank selectors, and specialized control and process systems.

LITHIUM CORP. ANNOUNCES NEW DIVISION, APPOINTMENT

J. Douglas Campbell, vice president, sales, Lithium Corp. of America, Inc., Minneapolis, Minn., announces the creation of a Technical Service division in

to Page 96 →

for decorative
and functional
printing or coating

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Decoratively, it will print intricate designs and patterns, in one or more colors, with speed, precision and efficiency. Heavy deposits of metallic, or flourescent inks thus become practical with a General Decorator.

Functionally, it can apply the necessary deposits to certain integral parts which may be a part of the machine's operating mechanism. For example, the depositing of plating and acid resists in the manufacture of printed circuits and other etched products. Also, it can apply special coatings of adhesives, lacquers, and remoistening glue, overall or in restricted areas, at a productive rate that will speed manufacturing operations.

The possibilities for utilizing a General Decorator Press are almost limitless...and worth your complete investigation.

General Thermo Jet Dryers will reduce to seconds the drying time on many inks, coatings, resists, and adhesives which are applied by silk screen, roller coating or spray methods.

Write for full information.

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572 S. Division Ave. • Grand Rapids 3, Michigan

General work session in the Berwyn room.

Time out for lunch in the American room.

Porcelain Enamel Institute holds mid-year divisional conference

THE Porcelain Enamel Institute held its Mid-Year Divisional Conference at the Edgewater Beach hotel, Chicago, May 9-10, for the purpose of bringing before its members topics of interest and value in the field of architectural porcelain enamel, porcelain enamel signs, and general enameling.

J. F. Ingram, Ingram-Richardson Mfg. Co., chairman of the Architectural division of PEI, presided at the opening day's session, with E. F. McDonald, also of Ing-Rich, pacing the morning's activities, which consisted of revision of the first edition of the Recommended Standards For Manufacture of Architectural Porcelain Enamel On Steel. Current veneer-type standards, and the development for the first time of a draft for insulated panel standards, were under discussion by members.

The importance of color

A lively discussion on standard architectural colors ensued. Problems of color matching, with some companies reporting upwards of 1,000 different colors, were thoroughly aired. A color standard among enamelists was felt to be virtually impossible, according to those taking part in the discussion, as the desires and tastes of architects vary considerably. Some members reported that paint charts were often used to select colors for porcelain enamel applications.

H. S. Spencer, Jr., Erie Enameling Co., Erie, Pa., quoted statistics from a recent survey among suppliers and, of the 17 replying, 16 offered standard colors. It was felt, however, that the question of colors would always be subject to the whim of the purchaser, and the feeling that the color craze was out of hand was prevalent among those present. PEI, in an endeavor to draw up a standard list of colors, requested suppliers to submit their ideas of what standard colors should be, and after a hand vote, it was revealed that 16 companies offered to submit samples, with a view to correlating greens, blues, reds, etc. It was also suggested the same reds be placed in the class "'B' or better" acid resistance category.

Weathering tests discussed

Wm. N. Harrison, Enamel Metals section, National Bureau of Standards, Washington, D. C., spoke briefly on weathering of porcelain-enameled panels in various parts of the country, and made a recommendation that a standard, against which glosses may be checked, be set.

(See "Weathering of Porcelain Enamels Evaluated for Architectural Uses," this issue.)

A distance-perception value was also called for, and a motion was made, seconded, and passed that a distance of five feet, or a distance at which panels would normally be viewed, whichever is greater, would be accepted and recommended as standard for manufacturers of architectural porcelain enameling.

Wm. S. Birney, U. S. Steel Corp., discussed building code revisions as they apply to the use of porcelain enamel curtain wall construction, and what is being done about it in various cities throughout the U. S. Codes are being revised in some areas to permit the use of porcelain enamel curtain wall construction, while in others, efforts in that direction are lagging. The porcelain enamel industry stands to gain much in the relaxation of existing restrictions, Birney stated, and members of PEI should make every effort to further this end.

Wm. N. Brinker, Market Development manager, PEI, announced that the initial distribution of the long-awaited Curtain Wall Manual will be made soon. The 28-page, four-color publication, made possible through the efforts and participation of representatives from virtually every member firm, is expected to fill a real need in the porcelain enameling industry.

John C. Winget, Armco Steel Corp., spoke on Market Development, and displayed charts outlining objectives of the 1958 market development campaign. Various advertising budgets were discussed, and it was suggested by J. W. Vicary, Ervite Corp., president of PEI, that a stepped-up program be put into effect, endorsed by PEI, and set at $25,000.

Technical Sub-committee activities, relating to adhesives, gasketing, and caulking, were brought to the floor by A. C. Weierich, Davidson Enamel Products, Inc. Tentative recommended specifications for vinyl gaskets for metal curtain wall construction were, at the request of Gordon Hahn, accepted, and A. F. McDougald, Wm. A. Reynolds & Co., brought the group up to date on extruded shapes of gasket materials, meeting of specifications by suppliers, etc.

A report covering Forest Products Aging Tests, as applied to adhesives, was read by Roger Homke, Minnesota Mining & Manufacturing. Used in the laminated insulating panel tests were one phenolic and three neoprene bases.

Industry statistical program

At the evening dinner meeting, devoted to Industry Statistics, an open forum, presided over by PEI President Vicary and A. J. Doescher, Ernst & Ernst, covered the basic aims and objectives of a PEI-sponsored statistical

to Page 110 →

Phil Coffer,
President of C & H Supply Co., Manufacturers of Metal-Cals

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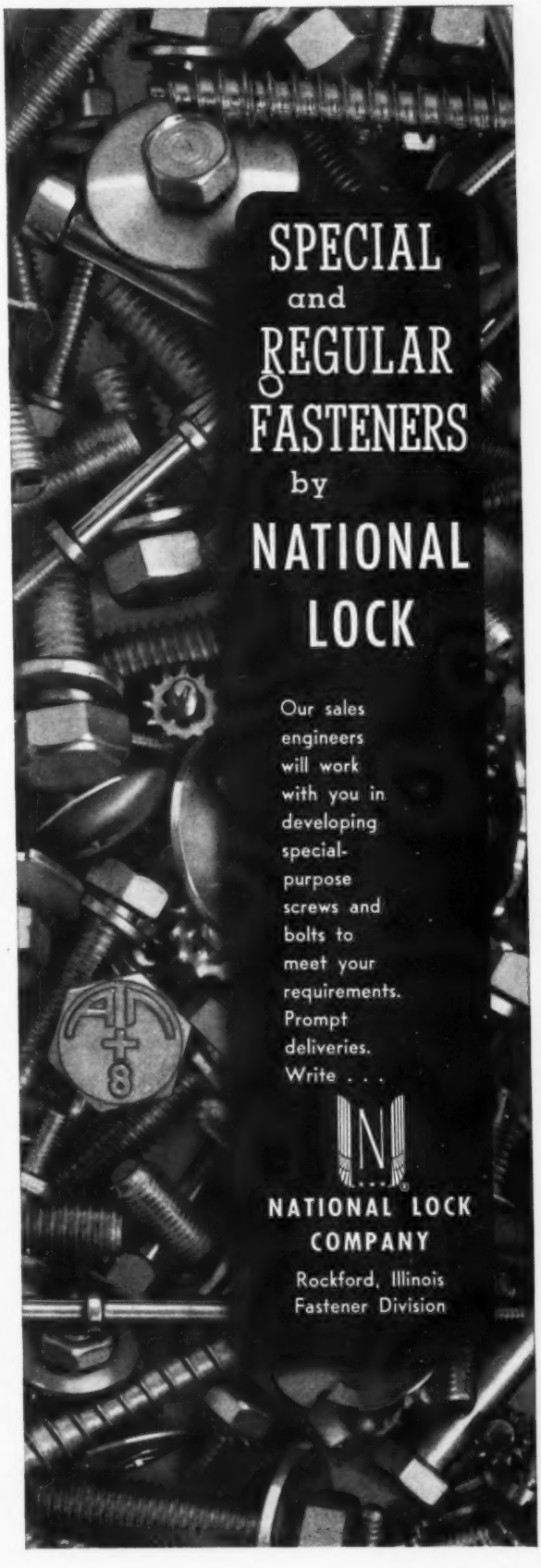

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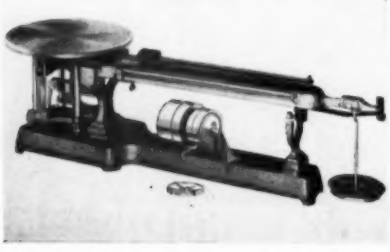
HEAVY DUTY SOLUTION BALANCE

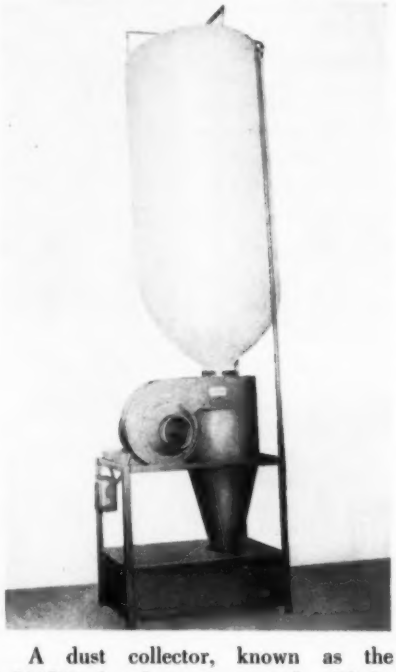


A new line of heavy duty solution balances, featuring a convenient weight carrier rack to store the attachment weights within quick reach of the operator, has been introduced. A spring-loaded auxiliary tare poise has also been added to facilitate faster and easier taring of empty containers. New finishes on several components have also increased corrosion protection. Bearings are self-aligned hardened steel. Models are available in metric and avoirdupois standards. Dept. MPM, Ohaus Scale Corp., 1050 Commerce Ave., Union, N. J.

SLASHED-SERRATION CONTACT WHEEL

A rubber contact wheel which, according to the manufacturer, has increased belt life as much as 40 per cent, has been introduced. The unit, for use on backstand grinding and polishing operations, is made with an exclusive slashed serration which is more abrasive resistant than rubber compounds previously used in contact wheel manufacture. An improved type of flange construction eliminates the possibility of mis-seating the flange because it is an integral part of the wheel, and is permanently attached to the hub. Dept. MPM, Chicago Rubber Co., 651 Market St., Waukegan, Ill.

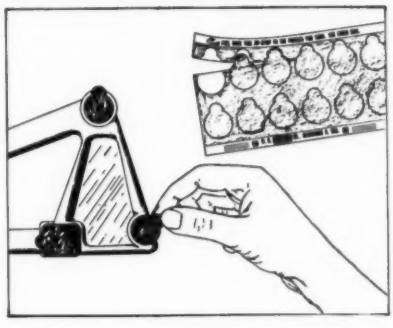
AIR RECIRCULATING TYPE DUST COLLECTOR AVAILABLE



A dust collector, known as the #20C30, has been announced. Of the air recirculating type that requires no outside exhaust outlet, the unit is said to have an air capacity of 2,405 cfm, and a dust capacity of six cu. ft.

Dust particles are separated from the air within the unit by a cyclone separator, and the dust is precipitated into a bin located in the base. Air is exhausted into a bag which filters out the finest dust particles and releases the dust-free air into the work area. The unit is designed specifically for use in pattern shops, model shops, and small woodworking industries, and is said to be efficient when used in buffing and grinding operations. The collector has many applications in the chemical industry as well. Dept. MPM, Aget Manufacturing Co., Adrian, Mich.

NEW TAB MASKS PULL OFF FAST

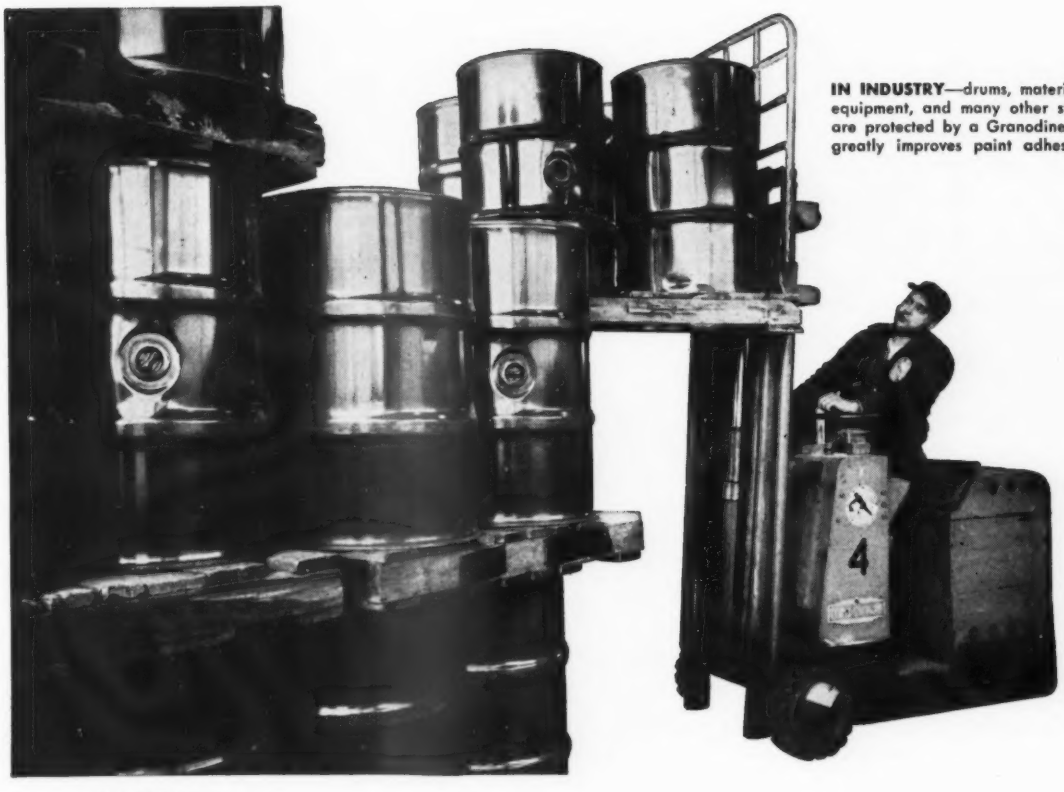


This pre-cut, self-sticking mask is removed quickly and neatly by means of a non-adhesive tab which is part of the mask. Originally intended for masking hard-to-reach and recessed areas, the new Tab Mask will speed finishing wherever pre-cut masks are used; in spray painting, anodizing, vacuum-metalizing, etc.

The non-adhesive tab folds back out of the way when applied. To remove, grab the tab and pull. The Tab Mask eliminates all use of tools or sharp instruments to remove masks from a finished piece. The masks are pre-cut in any shape to exact specifications. They can be furnished in a variety of masking tapes to suit most finishing conditions of temperature, bake cycles, and materials. They come mounted on dispenser cards for fast applications and easy storage. For free sample of the new Tab Mask, and literature on stock and special pre-cut masks, write Dept. MPM, W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 9, Wis.

DWARF SELENIUM RECTIFIER

One of the tiniest selenium rectifiers, for the current and voltage it handles, is available. A 5 milli-ampere DC half-wave rectifier which will handle up to 125 volts AC with a restrictive load, the unit is about one-fourth as long as a paper clip. The rectifier is available only in half-waves, but several units may be connected for other circuits such as bridge, center tap, and doubler. They may be used for test instruments, small power supplies, computers, control circuits, bias supplies, etc. Dept. MPM, Bulletin No. 242, Semiconductor Div., Radio Receptor Co., Inc., 240 Wythe Ave., Brooklyn 11, N. Y.

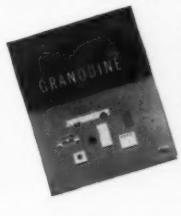


IN INDUSTRY—drums, materials handling equipment, and many other steel products are protected by a Granodine base, which greatly improves paint adhesion.

ACP *Granodine*® —BASE FOR DURABLE PAINT FINISHES ON DRUMS, MATERIALS HANDLING EQUIPMENT, AND OTHER STEEL PRODUCTS USED IN INDUSTRIAL PLANTS

Granodine Process	Type of Coating	Method of Application	Government Specifications
Granodine 20	Zinc phosphate (microcrystalline)	Dip	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 30	Zinc phosphate	Spray	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 45	Zinc phosphate	Dip	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 65	Zinc phosphate	Spray	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 80	Zinc Phosphate	Spray / Dip	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S A. 57-0-2, Type II, Class C
Granodine 500	Iron phosphate	Spray	
Granodine 50	Zinc phosphate	Brush	Under certain conditions, this process will meet one or more of the above specifications

ACP Granodine firmly bonds the paint finish on many steel products used in industrial plants, giving them lasting protection by converting the surface to a nonmetallic phosphate coating. This chemically deposited film greatly increases the adhesion of the finish and also provides high corrosion resistance — even when used in conjunction with a relatively thin and flexible paint film.



LEARN MORE ABOUT ACP GRANODINE Bulletin 1380 describes the various types and gives information which will help you select the proper one for your particular application. Write for your copy today.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 33, Pa.

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CHEMICALS ACP PROCESSES

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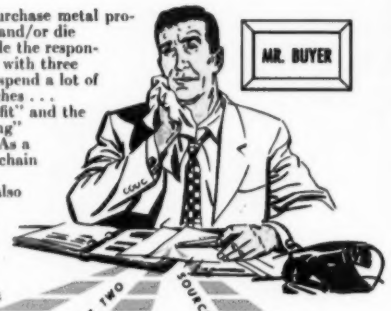
THE OLD WAY

Mr. Buyer: When you purchase metal products and/or plastic parts and/or die cast products, do you divide the responsibility for these 3 services with three different sources and then spend a lot of time . . . and many headaches . . . trying to co-ordinate the "fit" and the "finish" and the "scheduling" into a workable pattern? As a matter of fact this buying chain probably extends beyond the three main sources to also include tool and die or mold shops; metalizing or second surface plastic painting or plating of die cast parts, etc., etc.



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THE NEW WAY

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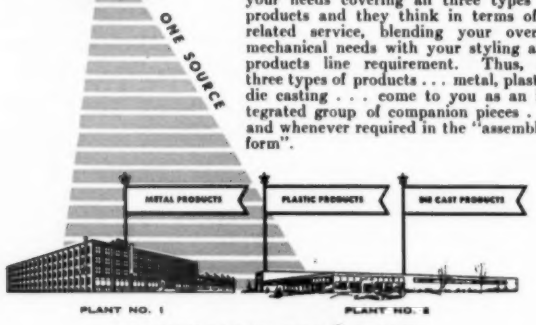
Now there is a new way . . . the Grammes way . . . by which you can consolidate the full responsibility for all of these services with one source . . . GRAMMES.

—AND IT IS MORE ECONOMICAL for obviously you can save a lot of time and money dealing with one source rather than three, four, five or six . . . there is only one overhead and handling charge . . . your Engineering and Scheduling Divisions need contact only one source . . . the parts come to you "in balance" . . . your one source knows the full story respecting all your needs covering all three types of products and they think in terms of a related service, blending your overall mechanical needs with your styling and products line requirement. Thus, all three types of products . . . metal, plastic, die casting . . . come to you as an integrated group of companion pieces . . . and whenever required in the "assembled form".



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Because of greatly expanded facilities GRAMMES who have for many years been known for their wide range of services are now in position to do an even bigger and better job making special goods to your specifications, employing the following arts:

Etching—Lithographing—Embossing of Metal
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Please send blue prints or sketches or word ideas . . . we will gladly design, engineer and quote . . . and then make.

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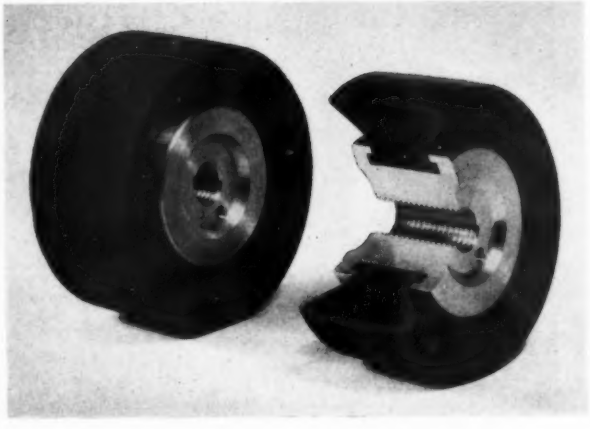


NU-MATIC announces new principal in inflated grinding wheels

The new "Aircore" design consists of only TWO parts . . . the drum and the core. And, it is SELF SEALING . . . as the hollow rubber drum is inflated it automatically makes positive, leak-proof contact with the metal core.

Check these PLUS features

PRECISION OPERATION. Wheel always runs true because rubber drum seats on accurately machined core. Vibration-free operation.

FEWER PARTS TO STOCK AND MAINTAIN. No nuts, bolts or sideplates.

TROUBLE-FREE CORE. Made of machined aluminum. Can't break, crack or leak. Will last a lifetime.

Three models are available: 3" diameter x 2" width, 4" diameter x 2" width, 5" diameter x 3½" width.

WRITE FOR COMPLETE SPECIFICATIONS. Also, ask about Nu-Matic's new "Flexcore" . . . an expanding-type grinding wheel with replaceable rubber segments.

NU-MATIC GRINDERS, INC.
8224 CARNEGIE AVE. CLEVELAND 3, OHIO

New Industrial Literature

EMBOSSED ALUMINUM FINISHES

A pocket-size pamphlet, "Fairmont Embossed Alumiunm Finishes," containing specifications for pattern, temper, thickness, and widths, complete with actual samples of the aluminum sheet, is now available. Dept. MPM, Fairmont Aluminum Co., Fairmont, W. Va.

BOX CLOSURE METHODS

A "Guide To Better Closures", especially prepared for users of fibreboard boxes and packages, has been made available. The brochure is intended as a guide for the evaluation of methods currently in use to effect economies and stepped-up production in the closure of fibreboard boxes. It contains a collection of reliable information on closure methods, according to the manufacturer, and the booklet deals with such closure methods as hand and machine gluing, taping, stapling, and wire stitching, along with the advantages and disadvantages of each. Dept. MPM, Acme Steel Products Div., Acme Steel Co., 135th and Perry Ave., Chicago 27, Ill.

MAGNET WIRE TRADE NAME DIRECTORY OFFERED

A complete 16-page directory of current Magnet Wire Trade Names, as used throughout the electrical industry, is being offered. Included in this comprehensive directory are the various trade names designations as used and submitted by 20 magnet wire manufacturers. It also gives a brief general description of the physical, chemical, and electrical characteristics and applications common to the ten general classifications of magnet wire. Dept. MPM, Magnet Wire Division, Essex Wire Corporation, Ft. Wayne, Ind.

FOR PRODUCTS WAITING TO BE MADE

A folder, called "For Products Waiting To Be Made," has been released for the benefit of engineers with new products on the drawing board. The folder relates to the use of vinyls, lacquers, synthetics, and epoxies. Dept. MPM, Stanley Chemical Co., subsidiary of The Stanley Works, 111 Elm St., New Britain, Conn.

FRESH SLANTS ON HARDWARE DESIGN AVAILABLE

Fresh hardware ideas for appliances, equipment, cabinets, and furniture; and special design service, are described in a new "Idea File" that is being offered. Contents of the file-size folder include case history reports, illustrated catalogs, applications tips, a field representative directory, and other helpful material. Manufacturers and designers may write Dept. MPM, Amerock Corporation, Rockford, Ill.

BOOKLET ON HOT SPRAY HEATERS

The newest edition of the booklet "Why Hot Spray?" has been made available. The brochure deals with the advantages of hot spray applications, with pictures and case histories included. Dept. MPM, The Spee-Flo Co., 720 Polk, Houston 2, Texas.

MAGNESIUM FINISHING PROCESSES

Development of two magnesium finishing processes to replace Dow #17 and Dow #18 has been announced. The single package processes are designed to provide magnesium with better corrosion resistance, abrasion resistance, and paint bonding properties, to eliminate the need for precise measuring and mixing of several chemicals, and to overcome the resultant inconvenience and chance for error, according to the manufacturer. Dept. MPM, Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.

WHERE TO USE ALUMINUM-COATED STEEL

A new booklet shows designers where to use aluminumized steel Type 1 (aluminum-coated) to increase appliance life and efficiency. Some of the subjects covered are heat reflectance, heat and corrosion resistance, strength, and reduced costs. Typical gages and advantages are given for parts of ranges, electric and gas heaters, water heaters, laundry dryers, toasters, and household appliances. Brief sections on fabricating, and aluminized steel tubing, are also included. Dept. MPM, Armco Steel Corp., Product Information Service, Middletown, Ohio.

COLOR FILM ON ALUMINUM

Alumnium is spectacularly presented in its role as the "chameleon of metals" in this sound motion picture. Lasting 18 minutes, the film takes the viewer through a fantastic dream of form, color, and texture in a myriad of hues. Appeal of the movie is tremendously imaginative as it portrays today's practicalities and tomorrow's possibilities of design with the light metal. Organizations wishing to borrow the film should write Dept. MPM, Motion Picture Section, Aluminum Company of America, 1501 Alcoa Building, Pittsburgh 19, Pa.

FILM ON MACHINING STAINLESS STEEL AVAILABLE

A 30-minute sound motion picture showing free-machining steels that can be worked at high rates of production is now available. Tool composition and proper use for different kinds of tools are demonstrated. Tool grind principles are outlined, and proper setups to insure rigidity, and to prevent vibration and shock to tools, are shown. To obtain the film "Machining Stainless Steels," write Dept. MPM, The Jam Handy Organization, 2821 East Grand Boulevard, Detroit 11, Mich.

MILL PRODUCT CATALOG FOR 1957

An 18-page booklet, intended as a convenient reference guide for preliminary discussion of design and fabrications considerations, is available. Features of the edition include information on industrial foil, and revised, clearer weight charts for wrought and casting alloys. Included in the booklet are selection guides for wrought alloys in sheet, plate, and foil, wire rod and bar, tubing and pipe, extruded and structural shapes, and for casting alloys. Dept. MPM, Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.

Send your "New Literature" releases to MPM's New Literature editor for announcement in these columns.

Weathering of porcelain enamels evaluated . . .

(Continued from Page 53)

Acid resistance-weathering

A few of the red enamels were found to deviate from the relationship: For example, conditions at the Lakeland site caused fairly large color changes in red enamels that had been given a good rating in the acid-resistance test that had been used. A slow oxidation of the cadmium-selenium-sulphur pigment incorporated in the red enamels was believed to be responsible for the color change during exposure; hence, a laboratory test was devised in which specimens were subjected simultaneously to highly oxidizing conditions and to acid attack. The treatment consisted of 2½ hours in a boiling 10 per cent (by weight) solution of nitric acid. Results showed that, when the weight loss of a laboratory specimen after this treatment was greater than 1 mg/cm², poor weather resistance was observed on its counterpart subjected to exposure; when the weight loss was less than 1 mg/cm², the weather resistance was good.

The four selected sites all have fairly high annual rainfalls. Since weathering action is dependent on moisture, surface deterioration would be expected to proceed at a slower rate in a dry climate than at Washington, Lakeland St. Louis, or Atlantic City. Likewise, in an area of extremely heavy rainfall, the weathering action would undoubtedly be accelerated.

Useful survey recommendations

Among the recommendations based upon the findings of this investigation, the one that may prove to be of greatest usefulness for specification purposes states that, for architectural installations where general appearance, absence of fading, and ease of cleaning are important, only those enamels having class A or class AA acid resistance by the standard citric acid spot test should be used. In addition, for enamels containing the cadmium-selenium-sulphur pigment (red, orange, and yellow), only those compositions should be selected that will give a weight loss of less than 1.0 mg/cm² when subjected to a boiling solution of 10 per cent nitric acid for 2½ hours.

The electroplating of zinc die castings

(Continued from Page 65)

cated operating temperature or at room temperature but should be heavier than .0002". The thickness should be adjusted to the service requirements.

Purification of solutions

Nickel solutions used on zinc tend to accumulate zinc in solution. When the amount present becomes sufficiently great, streaking will occur as the result of the plating of nickel-zinc alloys of relatively high zinc content. In the case of the cold solutions containing sodium sulfate, this difficulty arises when .3 gram per liter of zinc is present. Warm nickel solutions used over an adequate strike coating rarely need purification unless a substantial number of deeply recessed or hollow shapes is plated at one time. In the warm nickel solution described on this page, approximately 1 gram per liter of zinc must be present before streaking occurs. Definite brightening and some tendency toward cracking are observed, however, when the amount of zinc in this bath exceeds .3 gram per liter.

Carbonate treatment satisfactory

Several methods are available by which to remove excess zinc and bring the solution back to workable condition. Of these, the basic nickel carbonate treatment has proven very satisfactory. Instructions for its use follow:

Raise the pH* to 6.8. Heat the solution to 140-160°F. (60-71°C.) and add a small amount (1-3 ounces per gallon or 7.5-22.5 grams per liter) of freshly prepared basic nickel carbonate. A heavy white precipitate should form. If no precipitate is evident, add more basic nickel carbonate until the precipitate does form. If the solution is to be used cold, allow to cool overnight and filter. If the warm type of bath is treated, allow to stand overnight and filter hot. Adjust pH and nickel content before starting to plate.

Embrittlement a problem

Attention is again called to the embrittling effect of carbonates in the cold types of solution. Carbonates may be removed by boiling, agitation, lowering of pH or a total of these treatments.

Basic nickel carbonate may be prepared by adding 1 part of sodium carbonate to 7 parts of nickel sulfate in just sufficient water to dissolve the nickel sulfate.

This treatment will remove virtually all of the zinc, iron and aluminum which may have accumulated.

It is frequently desirable to eliminate sources of pitting at the same time that the solution is being purified of its zinc content. This may often be accomplished by the simple addition of an oxidizing agent such as hydrogen peroxide. The use of finely divided activated charcoal and absorbing materials of a proprietary nature in the filter press is also fairly common and may be regarded as a substitute for the ferric hydroxide procedure.

Filtration a necessity

Most proprietary bright nickel solutions contain wetting agents which so control pitting that additions such as described here are unnecessary. Regardless of whether zinc contamination or serious pitting is encountered, it is considered good commercial practice to filter all nickel solutions at frequent intervals, *continuously if possible.* Copper solutions are generally regarded as requiring filtration, at least once a week, to obtain the smoothest type of deposit. A warning should be given that filter pumps used in the handling of different types of solution be given a thorough cleaning after each use. The danger of contamination of one solution from ingredients present in another solution is very serious.

The Research Committee of the American Electroplaters' Society has under way a research project to study methods for purifying plating baths. It is recommended that the reader follow the progress of this work*. Research Reports may be obtained from Society Headquarters.

*The choice of alkali varies with the different nickel solutions. Ammonia should not be used with a Watt's nickel bath nor should sodium hydroxide be used with either of the warm nickel solutions. Lime would seem to be the best addition for general use. Nickel hydroxide may also be used.

* See D. T. Ewing and W. D. Gordon, A.E.S. Research Report Serial No. 15

NEW ZINC INSTITUTE OFFICERS

At a recent annual meeting of the board of directors, S. D. Strauss was elected president of the American Zinc Institute. Strauss is vice president and manager of sales, American Smelting and Refining Co., New York City.

Other officers elected were three vice presidents: J. D. Bradley, The Bunker Hill Co., San Francisco; Clarence Glass, Anaconda Sales Co., New York City, and H. L. Young, American Zinc Sales Co., St. Louis. E. V. Daveler, American Zinc, Lead and Smelting Co., New York City, continues as treasurer, and J. L. Kimberley was reelected executive vice president and secretary.

Milling with chemicals

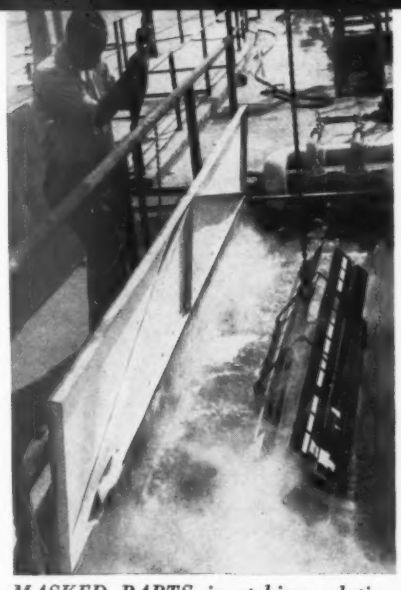
→ *from Page 48*

The parts depicted in the photographs with this article are mostly for use in an airplane or missile, but parts chemically milled in the same manner would be applicable for use on a multitude of other manufactured products.

The diagram displayed in this article illustrates a basic chemical milling installation. Modifications could be made to suit the individual cases. When more than one metal will be chemically milled, it is not necessary to duplicate the entire setup — only different etching tanks for the different etching solutions must be used. One pilot line for chemical milling of steel and titanium occupies less than 800 sq. ft. of floor space, yet the tanks will handle parts up to 3 ft. by 4 ft. in size. Cost of the installation is limited largely to the tank and the handling equipment. Special holding fixtures, jigs, perishable tools, tool sharpening, highly skilled employees — all are practically eliminated by chemical milling.

Metal determines type of etchant

Caustic-type etchants are used on aluminum alloys, and acid-type etchants on steel, magnesium, and titanium. The acid-type etch tank must be lined with a chemically resistant plastic liner; all other tanks are of mild steel construction. The etchants used on aluminum are operated at 180 degrees F.; the other etching solution are maintained at mildly elevated temperatures, in the neighborhood of 130 degrees F.



MASKED PARTS in etching solution. Masking film cutouts are on areas to be chemically milled.

The heat treat condition of the metal at the time of chemical milling is not important. Parts may be formed and heat treated, then chemically milled. The "Chem-Mill" process induces no stresses of its own in the material, and any warpage will be from stresses already in the metal stock prior to etching. Surface smoothness of chemically milled parts is usually between 30 and 80 microns and the microscopic irregularities that make up this degree of surface roughness have a gentle hill-and-valley shape, with no tendency to form stress concentration points. The sharp v-notches characteristic of the cutting tool are absent.

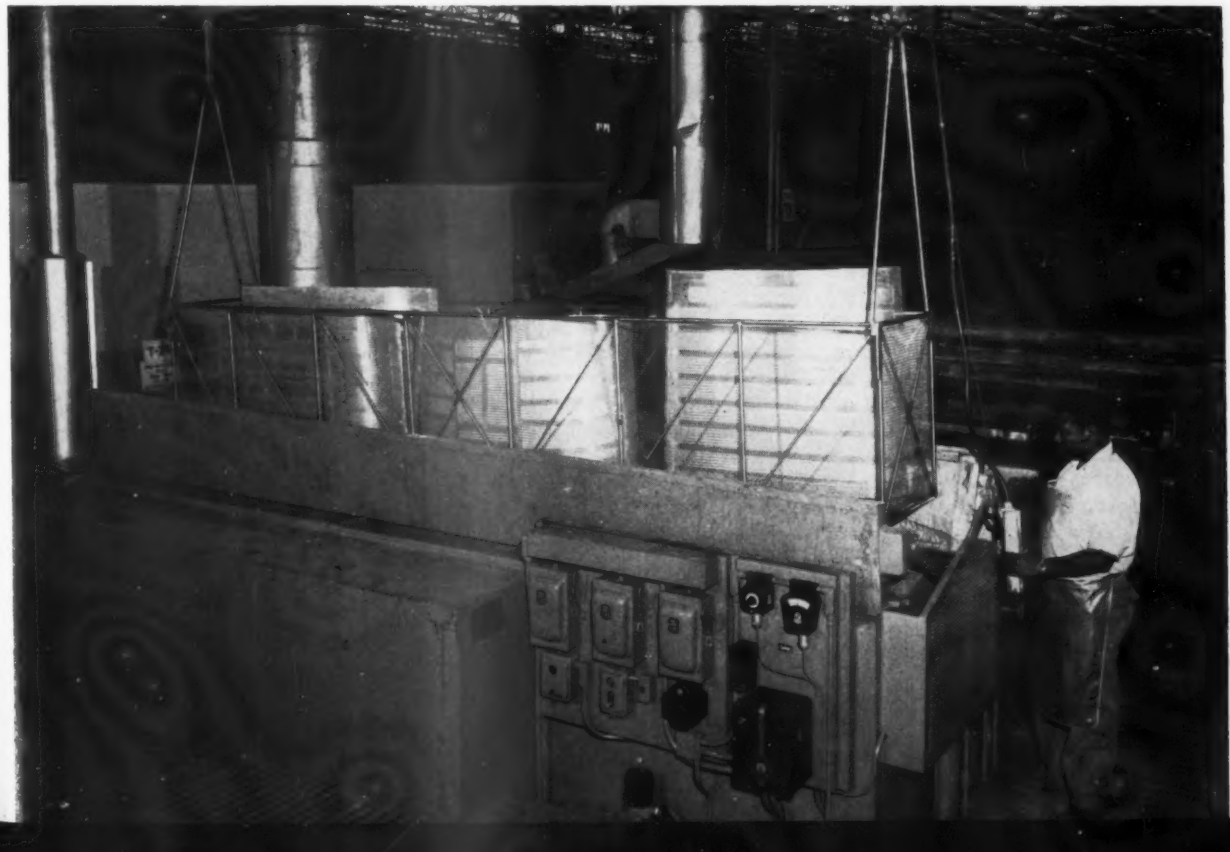
Titration techniques for control

Simple titration techniques are used to keep the etching solutions at optimum working strength. Good temperature control provides better tolerances and more consistent etching speed. In the North American Aviation aluminum set up, the etching solution is constantly circulated through a centrifuge to remove all solids.

The fact that the original equipment is low in cost, and that with this minimum investment a shop will be properly "tooled" to turn out a part of any imaginable shape from any available metal alloy, would point to many possibilities for the appliance and fabricated metal products industry.

Other possibilities that enhance this value are: (1) Parts can be formed and heat treated prior to milling; (2) Several parts can be chemically milled at one time; (3) Shapes can be milled chemically that would be impossible to mill by any known conventional set up, or, conversely, a shape extremely expensive to produce by conventional milling, can be produced just as cheaply as the simplest shape by chemical milling. The design engineer can specify a web, contour, cut-out, or silhouette without worrying whether or not it can be machined, or what the cost will be.

CHEMICALLY MILLED PARTS, after rinsing and removal of masking film, being lowered into a tank-type dryer.



ELECTRIC SPACE CONT'D. FROM PAGE 39

special needs, heaters that are suitable for the home, farm, industry and commercial applications.

More intelligent promotion

Most manufacturers are conducting educational meetings in the field, displaying equipment and otherwise assisting distributors and contractors in promotional activities to sell electric heating properly. The Electric Space Heating Section of NEMA has developed a comprehensive heating guide that is written in simple terms, to establish standard procedures for calculating heat losses and operating cost estimates.

This section is also responsible for providing the incentive and joining their efforts with the Mineral Wool Assn., which is an association of thermal insulation manufacturers, in producing a booklet that is a simply written, "Guide on How to Insulate for Electric Heating". Publicity and promotional films on electric heating are also prepared by the Electric Heating Section.

Utility survey favorable

Recently, the Electric House Heating Section of NEMA conducted a survey of the power suppliers throughout the country. A total of 420 of the power suppliers responded to this survey questionnaire. The principle question asked was: "What is your attitude toward complete electric house heating when properly engineered and installed?" 244 power suppliers or 58% answered favorable. Neutral replies totaled 108 power suppliers or 26%, and unfavorable replies came from 68 power suppliers or 16%. However, by giving the proper considerations to qualified statements of the power suppliers in the neutral class, the percentage in the favorable class is 70%.

Low initial cost a factor

The initial cost of installing electric heating is less than other systems you might install. It is a space saver because you don't have to allow space for a furnace, pipes or ducts, radiators, build chimneys, or provide storage space for fuels. Such space and its cost can be eliminated or used to serve other purposes.

Electric heat is dependable, provides ideal comfort along with flexibility. It provides heat when and where the user wants it. Zone control or individual room control is easily provided. Different temperature levels may be maintained in each zone or room, and the heat can be readily turned down or turned off completely.

ADDED ROOM HEAT is quickly supplied by this 3000-watt floor model which circulates warm air quickly and evenly and is a good heat source, particularly where alteration of an existing central heat system would be too costly.

Electric heat is safe and healthful; a properly installed heating system is as safe as the light you read by. Electric heat eliminates the need for intermediate heat transfer mediums, avoiding the waiting time involved to transfer heat from one point to another. Electric heating equipment is simpler to maintain than other types of heating equipment. The entire system will never be down for repairs.

Importance of insulation

Adequate thermal insulation is essential to any type of heating system used, if you wish to provide maximum comfort and economical operation. Since all reputable manufacturers recognize that electrical energy is generally a premium fuel, they have been more consistant in insisting that adequate insulation is essential to satisfactory results in comfort and economics, than have representatives of other fuels. Adequate insulation will reduce the size or capacity of the units required insuring minimum equipment cost and minimum operating cost. Easily 50% of the heat required can be saved when a structure is fully insulated, when compared against a structure that is not insulated. Since summer cooling is fast becoming a basic part of the modern way of living, thermal insulation plays the same role in the summertime that it does in the wintertime. The savings in heating and cooling costs usually is enough to pay for the cost of the insulation within a few years. Additional benefits are the increased comfort provided and the reduction of outside noises which are often overlooked.

Expandable service

We are fast approaching the time when a 100 ampere service will be standard. The current "Adequate Wiring Campaigns" and "Live Better Electrically Campaigns" will speed us toward this goal. A lot of electric heat is being safely and successfully served from a 100 ampere service. I feel reasonably sure that the 100 ampere service will become a minimum standard everywhere; and it should be a service that is readily expandible, that is, one to which additions can easily be made in the future. A system of this type will not penalize the home owner, and it will protect the electrical future of that home.

Complete heating, however, represents only a small part of today's potential market. The auxiliary and supplementary uses of electric space heating represent, in my opinion, about 80% of the market. I believe it will maintain this ratio for the next few years. Auxiliary and supplementary electric heating uses represent only a relatively minor part of the living budget anywhere in the United States.

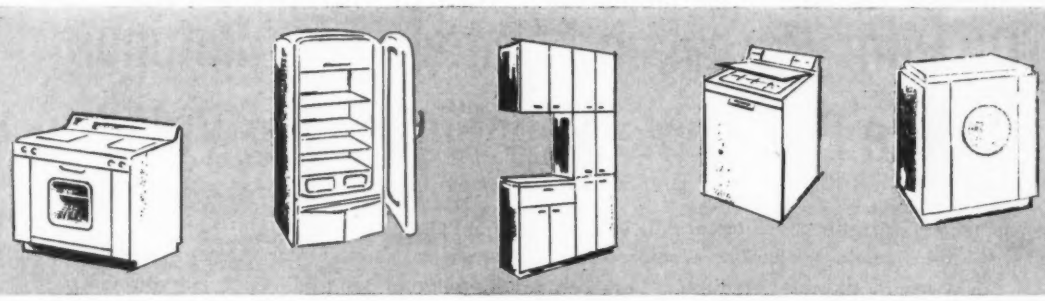
Electric space heating has a bright future. Electric resistance heating is the most practical means immediately available to provide a winter load to offset the electric utilities fast growing summer peaks. Electric resistance heating is considered a good load, and distribution facilities can carry more load during the wintertime than the same facilities can carry during high summertime temperatures. The electrically heated home usually brings the truly all electric home into actuality. Surveys indicate that the electrically heated home usually has a much greater appliance load than heating load. Surveys indicate that in an electrically heated home the kilowatt hour usage of appliances approximately doubles when compared with a home using other forms of fuel for heating.

Based on the rate of growth for the past three years, electric heating should grow at an accelerated pace in the years immediately ahead of us, and it is my personal opinion that we will be able to boast about one million completely electrically heated homes, factories and commercial establishments by 1960.

AN ALL PURPOSE PORCELAIN ENAMEL FRIT ?

No, of course not . . . But OHCO 959A is the next thing to it.

OHCO's 959A Tite Wite cover coat is the nearest thing yet to an all purpose porcelain enamel frit. It is ideal for refrigerators, ranges, washers, driers, dishwashers . . .



. . . and many other items. Why this versatility? . . . Because OHCO 959A is AA acid resistant, high in alkali resistance . . . has a wide firing range, good color stability, and works well with coloring oxides.

And 959A is tops in opacity, gives good coverage in a wide range of applications. It has been proven by performance in leading enameling shops. Try it and you'll find you save $ on your production line. Ask your OHCO representative for a demonstration or call . . .

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Dept. MPM-657

THE O. HOMMEL CO.

PITTSBURGH 30, PA.

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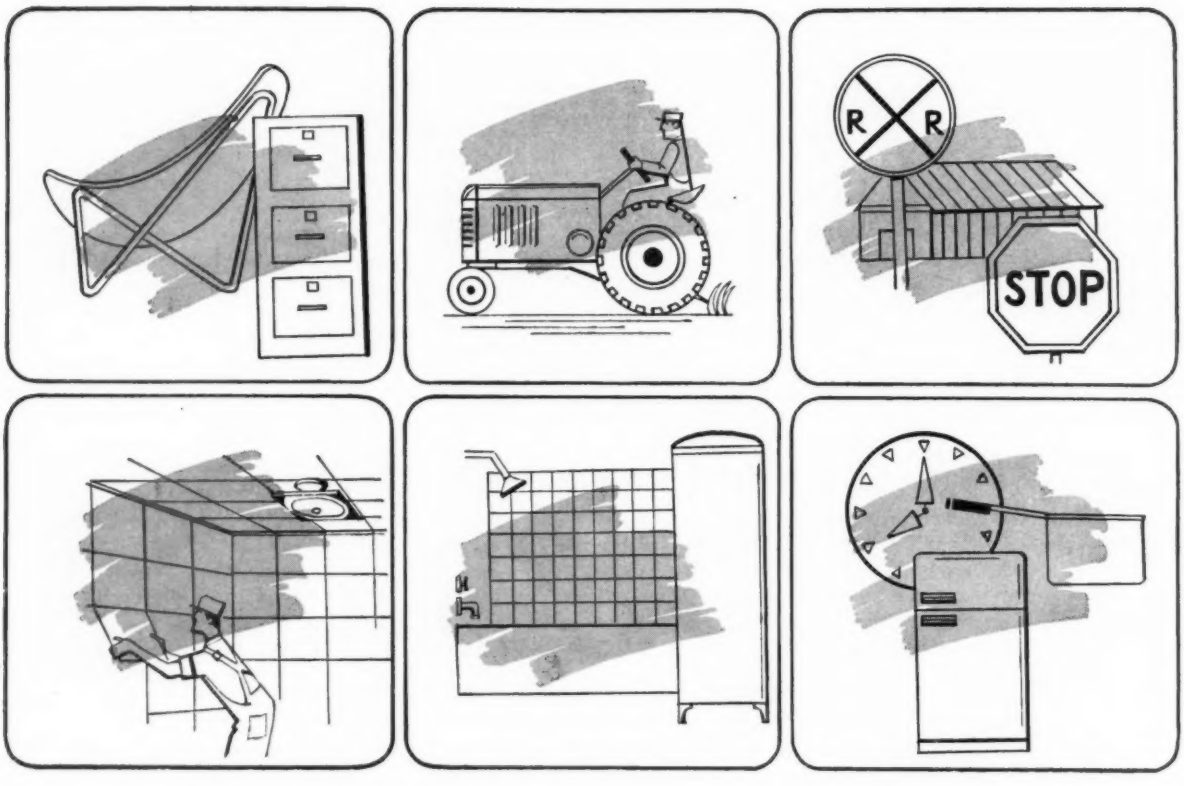

Du Pont Porcelain Enamels for Aluminum Create Profitable New Enameling Volume

Today, appliances, furniture, architectural tile, signs, machinery—more products than ever before—are made of lightweight, durable aluminum. This expanding market offers you an excellent opportunity to build enameling volume with Du Pont porcelain enamels for aluminum.

Du Pont enamels come in an unlimited range of lustrous colors. Practically indestructible, they form a remarkably rugged finish-to-metal bond. These enamels are lightfast, resist weathering, corrosion, heat, impact and salt-water attack. And they are easily applied with ordinary enameling and firing procedures.

Whether you are a fabricator who now supplies unfinished aluminum or an enameler who would like to add aluminum to the materials you now finish . . . or convert your whole operation to aluminum finishing . . . investigate Du Pont enamels for increased enameling volume and profits.

TECHNICAL ASSISTANCE . . . Du Pont manufactures porcelain enamels . . . but does no enameling. As a pioneer developer in these finishes, we can offer you useful information on how you can expand your enameling volume by adding aluminum enamels to your line of finishing services. Mail the coupon today.

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PORCELAIN ENAMELS
FOR ALUMINUM

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department, Wilmington 98, Delaware

☐ Please send me Technical Bulletin CP 4-454 and illustrated folder on Porcelain Enamel for Aluminum.
☐ Have your technical representative call with further details.

NAME_____ POSITION_____
FIRM_____
ADDRESS_____
CITY_____ STATE_____

PAINT REMOVING COMPOUNDS

→ *from Page 45*

applications. The acid strippers are usually made up of sulphuric acid with other minor components, while the emulsion types are combinations of solvents, accelerators, and emulsifiers.

Personnel safety precautions

As can be seen from the preceding discussion, in general, paint strippers are to a certain extent hazardous chemicals and should be treated as such. The caustic and acid types can cause severe burns, and personnel should be properly instructed and furnished with protective clothing, such as face masks, rubber gloves, and aprons. Adequate ventilation should be provided for all applications of paint strippers to prevent the accumulation of high concentrations of toxic fumes. With proper instruction, these compounds are no more dangerous than many other industrial chemicals commonly encountered.

It should be realized that it is quite difficult to make any general statement as to how long it will take for a stripper to function, as well as how long any given amount will perform satisfactorily. These are factors which are governed by the paint, its thickness, number of parts stripped, and other conditions which can only be determined by specific data. In general, a good stripper will remove one or two coats in less than five minutes, and sometimes less than one minute. A build-up of several coats, such as occurs on conveyor hooks, may require several hours.

Case histories

The Mitchell Manufacturing Company, manufacturers of air conditioning equipment, is using a hot caustic type stripper at 230 degrees F. with agitation. Metal parts for air conditioners are painted, using an Epoxy type of finish. These air conditioner parts have a stripping time of 15 to 20 minutes. Hooks, which are of a heavier piece of material, and with approximately eight coats of paint, have a stripping time of one to two hours.

The greater part of all internal metal parts of air conditioners are finished by the flow coat method. This method leaves heavy deposits of the Epoxy material on the multiple-hanging hooks. A regular schedule of hook stripping is a part of the flow coat method.

With the use of epoxy-type material, the problem of maintaining spray booths has increased to the extent that residue is harder to remove. Our stripping tank, and the paint removing compound stripping agent we use, is most helpful in stripping the collector fins and those components of the spray booth that require regular maintenance by stripping.

Continuous stripping at Hotpoint refrigerator plant

Normally, the stripping of paint is associated with the reclamation of production parts which have been improperly finished. This case history deals with the stripping of a black japan from a conveyor on a continuous basis.

In Hotpoint's refrigerator plant, cooling condenser fins, motor housings, and other parts are painted with a black japan by the dipping process. Parts are placed on a relatively-large hook or fixture. These hooks are approximately six feet tall. Parts, when properly placed, are so arranged as to drain the excess coating and insure that the parts do not drain from one article onto the next. The paint is brought to room temperature, and no heating of the parts is necessary.

The conveyor carrying system consists of 2,834 hooks, spaced 32 inches apart, giving a total approximate conveyor length of one and one-half miles. The conveyor is actually used for the complete processing of the unit. It is essential that all parts be correctly positioned on the hooks in order to give proper drainage. Repeated applications of paint to the hooks would result in a heavy build-up to the point where the parts to be painted could no longer be properly positioned. It therefore becomes necessary to strip the hooks.

A tank approximately 35 feet long and three feet wide has been installed for this paint stripping operation. The conveyor drops into this tank so that the hooks are submerged in approximately four feet of paint stripper.

The speed of the conveyor is approximately eight feet per minute. Since it requires 45 seconds for the hook to immerse and emerge, the hook is submerged to its fullest depth for three and one-half minutes.

After emerging from the stripping tank, the hook is sprayed for 30 seconds with a cold water spray. A six-inch water blanket is floated on the paint stripper in order to prevent evaporation. The water from the rinse drains into the stripping tank and forms the source of supply for the water blanket. An overflow pipe controls the tank level.

Laboratory tests, both in the supplier's research laboratory and in Hotpoint's laboratory, indicated that a cold-solvent type paint stripper would do the job effectively. Initially, the large tank was cleaned and filled with 3,600 gallons of this type of stripper. Plant use indicates that the laboratory tests have been entirely correct. Paint is not only being removed as applied, but all build-up has also been removed.

Each tank of stripper lasts 4-6 months before becoming ineffective. The paint solids are allowed to build up 10 per cent before the stripper is replaced.

*(Note) Some producers of strippers provide their customers with a reclamation service. The material to be reclaimed is either pumped out into the drums or into a tank wagon if the quantity is sufficient, and for a nominal fee, this material is reprocessed and the contaminants removed. The reclaimed material is then used for make-up as required. Reclamation usually nets between '50 per cent and 75 per cent of the volume processed.

→ *from Page 83*

the sales department, and the appointment of John E. Cordes as ceramic engineer. The division will enable the company to give more technical assistance to its various customers.

Cordes is a graduate of the University of Illinois (B. S. in Ceramic Engineering). For several years he has conducted research for Lithium Corp. on applications of lithium in ceramics.

DEVOE HOLDS PAINT CLINIC FOR COMPANY SALESMEN

The first of a series of clinics, designed to familiarize Devoe salesmen with the most recent developments in paint technology and merchandising methods, was held during a three-day period recently.

Twenty-eight salesmen, representing each of the sales districts of the Devoe Trade Sales division, met in one of the company's Louisville laboratories to witness demonstrations of new products, and to hear Eric H. Grant, director of Technical Services for Devoe, explain new paint formulations and the results obtained by them. Every major product line was discussed in detail, with emphasis on performance characteristics and sales features.

CERAMIC ON glass?

WHY NOT!

Here's **Goldie the CroMaid** designed to swim into your **IDEA-STREAM** with ideas. Truly, gold is the standard of elegance, the height of good taste for modern products. **Goldie's** delicacy of design may suggest a beautiful ceramic gold design on glass for your next model. What could be more modern? Panels, dials, nameplates of illuminated, edgelit glass are so easy-to-clean, won't wrap or mar either. No wonder appliance designers specify glass when they want quality! **Naturally, it's CRONAME decoration.** Send for a sample of **GOLDIE** and **IDEAS** today.

GLASS DECORATION IS A PRIMITIVE ART

CRONAME Glass Studios

a division of Croname, Inc.

1755 GRACE ST. CHICAGO 13, ILL.

Write TODAY for IDEAS

Please send me a sample of GOLDIE the CROMAID and your folder "New Dimensions in Product Design."

Name..... Title.....

Firm..... Address.....

City..... Zone..... State.....

SUPPLIER PERSONALS

David C. Verson, president of Verson Allsteel Press Company, Chicago, has announced the appointment of *Robert W. Hoefler* to the position of assistant sales manager. A graduate of Loyola University in Chicago, Hoefler has been associated with the Verson Company since April 1950.

Nils H. Lou has joined Reynolds Metals Co. as manager of manufacturing for the company's Parts division in Louisville, Ky., it has been announced by William G. Reynolds, vice president. Lou's responsibility will encompass all Parts division manufacturing facilities, Reynolds stated. Lou was formerly with Republic Aviation Corp.

HOEFLER

LOU

Robert B. Reed has been appointed chief engineer of Paasche Airbrush Co., a division of Cline Electric Manufacturing Co., Chicago. The announcement was made recently by Paul A. Benke, vice president and general manager of Paasche Airbrush Co.

At the meeting of the board of directors of Pemco Corp., *K. Herbert Turk*, formerly executive vice president, was elected president of the company; *Karl Turk*, former vice president and treasurer, was elected executive vice president; and *John R. Reuling* was elected treasurer in addition to his present office of comptroller. Richard H. Turk continues as chairman of the board and chief executive officer.

REED

K. H. TURK

to Page 109 →

PREWAY another user of PERMA-VIEW WINDOWS

PREWAY
ONE OF THE
56 LEADING
RANGE MANUFACTURERS
USING
PERMA-VIEW

RECTANGULAR

SQUARE

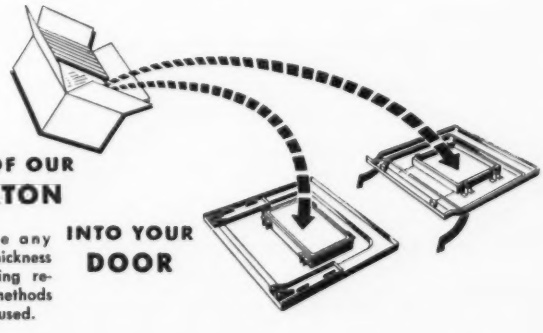
ROUND

TRAPEZOID

Preway, Inc. has been a satisfied user of PERMA-VIEW windows for a number of years. Now 55 other leading manufacturers are using "the window you can see through always."

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "No-Fog" window meets the constantly growing demand for "visible baking."

The PERMA-VIEW window is pre-engineered, and comes to you ready for immediate installation in your range — "out of our carton into your door." Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on the ease and economy of adding this sales feature to your new ranges.

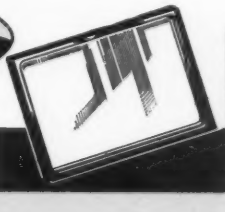


OUT OF OUR CARTON

INTO YOUR DOOR

We can manufacture any shape, any size, any thickness to meet your engineering requirements. Alternate methods of attachment may be used.

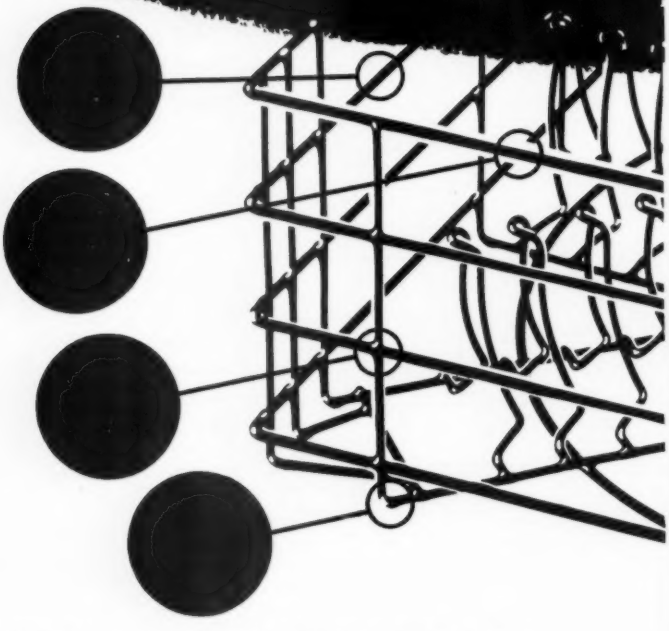
U.S. GENUINE PERMA-VIEW NON-FOG



MILLS PRODUCTS INCORPORATED

1013 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN

We Make Them Better



Attention to many small but important details add up to highest quality in the final product. Our policy here at Peerless dictates that quality must never be sacrificed to lower the price. Instead, lower costs are often attained through design modifications in our pilot models by simplified fabrication procedures which do not sacrifice quality. Here is where knowledge and experience combine to form wire products of the highest standards.

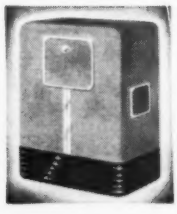
You undoubtedly have cost problems in your formed wire product components. We specialize in working to reduce or eliminate cost problems. We've been doing it since 1910.

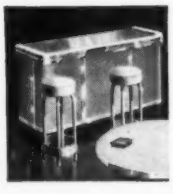
Our method is simple. Send us your drawings for a quotation by return mail.

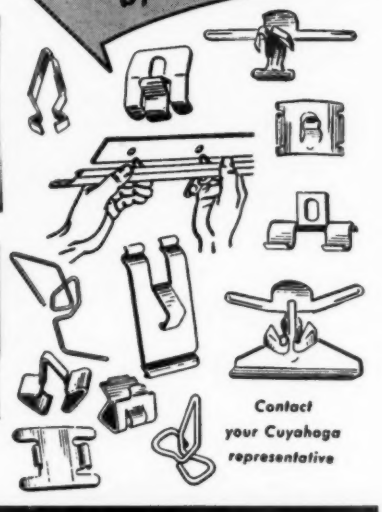
Peerless FORMED WIRE PRODUCTS

PEERLESS WIRE GOODS COMPANY, INC.
2702 FERRY STREET • LAFAYETTE, INDIANA
Peerless Products Please
ESTABLISHED 1910

MOULDING CLIPS by Cuyahoga!







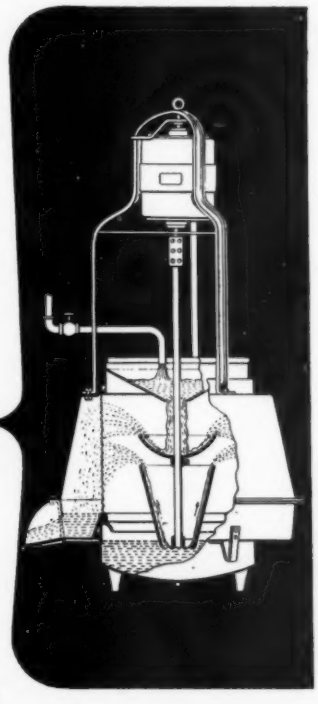
Contact your Cuyahoga representative

A SUBSIDIARY OF BARIUM STEEL CORPORATION

The CUYAHOGA SPRING *Co.*
10200 BEREA ROAD • CLEVELAND 2, OHIO

ROTOSPRAYING... *A Standard at Kohler!*

● Kohler of Kohler has been using Rotospraying as a method of sieving vitreous glaze for years. They have recently ordered Rotosprays for their new Spartanburg, South Carolina pottery—proof of their confidence in Rotospray equipment.



ROTOSPRAY

● Check your plant today and make sure that you have the correct number and size of Rotospray units for efficient operation.

ROTOSPRAY MANUFACTURING CO.
562 W. WASHINGTON BLVD. • CHICAGO 6, ILLINOIS

safe transit

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DANA CHASE PUBLICATIONS
York Street at Park Avenue
Elmhurst, Illinois

editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

CROWN ZELLERBACH ACHIEVES FIRST QUARTER RECORDS

Crown Zellerbach Corp., manufacturers of forest products, achieved new first quarter records in sales and production, a recent report from A. B. Layton, president, states.

Net sales of $110.7 million, and paper and paperboard production of 438,000 tons, were the highest for any first quarter in the company's history.

Layton pointed out that the extent of over capacity in the paper industry has been exaggerated. He cited a recent industry study which shows that new industry capacity scheduled to come into production by the end of 1959 is substantially less than indicated by earlier projections. "The continuing strong demand for paper," Layton said, "should absorb most of this additional capacity over the next several years. Thus, there is likely to be enough capacity to serve customers' growing needs, but not such a gap between capacity and demand as to jeopardize the successful operation of sensible and efficient producers in the industry."

Layton said Crown Zellerbach was following a policy of selective growth in "those product lines and in those market areas which offer the greatest economic promise." He pointed out that the company was tailoring its capital expenditures to its present and prospective earnings. He concluded that the company "is in an unusually good position to grow with the expanding market for paper and other forest products over the long haul while, at the same time, adapting its operations to the temporary fluctuations which occur in a free economy."

The share owners' meeting was presided over by Harold L. Zellerbach, acting chairman of the board of Crown Zellerbach Corporation.

4-YEAR PACKAGING SCHOLARSHIP

Frank Greenwall, president of National Starch Products, and A. Douglas Murphy, president, Packaging Institute, jointly announce the establishment of a scholarship in packaging engineering at Michigan State university.

Michigan State is the only institution of higher learning in this country that offers a four-year course leading to a Bachelor of Science degree in packaging engineering, the report points out.

Interested candidates possessing good high school records, of outstanding character, and in need of financial assistance, are encouraged to communicate directly with James W. Goff, Department of Forest Products, Michigan State university, East Lansing, Mich.

ACME STEEL'S FIRST QUARTER SHOWS INCREASE OVER 1956

Acme Steel Co., Chicago, reported first-quarter sales of $44,213,939, an increase of 40.6 per cent over the corresponding first quarter of 1956. Net income after taxes was $2,234,451, an increase of 16.6 per cent over the same period a year ago.

First-quarter figures for 1957 reflect the business of Acme-Newport Steel Co., while figures for the same period in 1956 do not. Acme-Newport was purchased by Acme Steel Co. on September 15, 1956.

In their joint letter to shareholders, Frederick M. Gillies, chairman, and Guy T. Avery, president, said, "While the present backlog of orders for basic steel products used by our customers as production materials is less than at any time last year, the sales of end use products such as steel strapping, stitching wire, hoops, and related packaging and shipping reinforcement items have maintained a fairly even pace with the average of last year."

"This gives support to the opinion that manufacturing companies are using up inventories of production materials while continuing to ship finished goods at a more normal rate."

BRAINARD EXHIBITS NEW STEEL STRAPPING TOOL

A new air-powered stretcher for steel strapping was featured in an exhibit by the Brainard Steel division of Sharon Steel Corp. at the Seventh National Materials Handling Exposition, Philadelphia, Pa., recently.

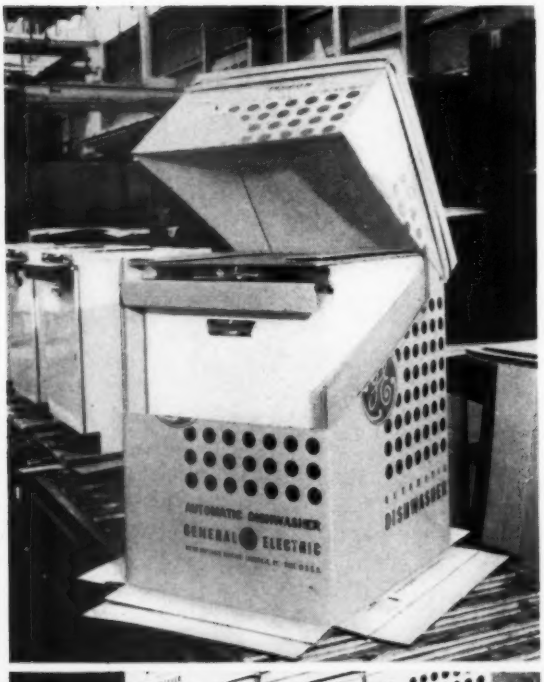
The new tool brings "production line" efficiency to applications using any size of tensional strapping, according to G. Allen Dolby, general sales manager, Brainard Steel division.

Weighing less than four pounds, Brainard's PNE Stretcher has unlimited take-up and pneumatically controlled tension, which reduce operator fatigue and errors in tensioning, the company stated.

to Page 109 →

CUTS HANDLING TIME 50%

with International shipping containers

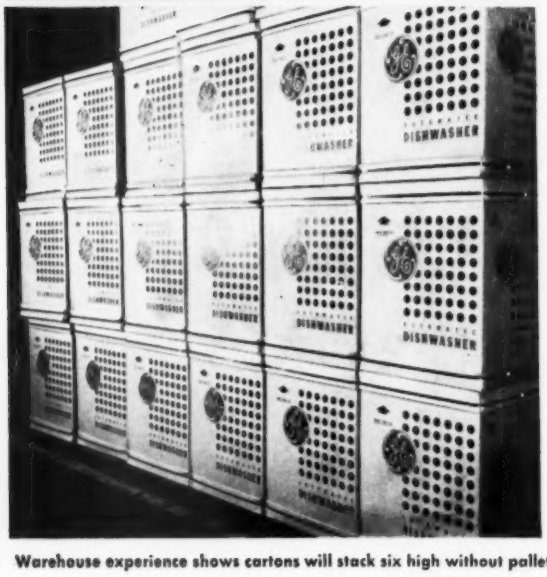


General Electric tested this corrugated container thoroughly in its laboratories before adopting it. Our own laboratories made it measure up to rigid specifications. Then, further punishing tests in the field. Result? A container that really slashes handling time . . . reduces damage rate to an all time low!

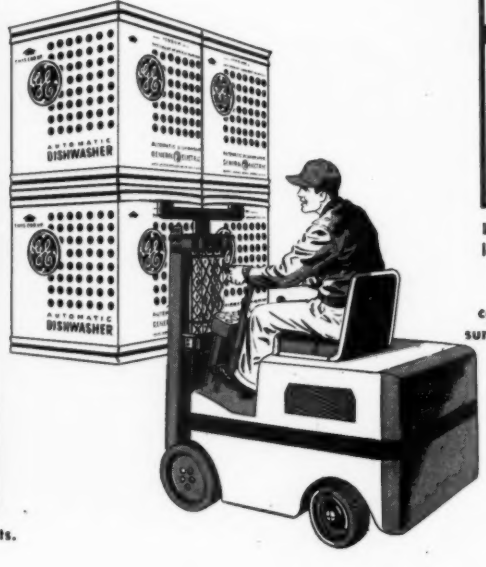
Other advantages:

- Special tube and cap design enables lift truck to handle easily without pallets.
- Interlocking flange cap provides grip for easier handling by retailers.
- Dust proof. Arrives factory-fresh.
- Containers can be opened without damaging contents . . . reclosed for further shipment.
- Spacious, clean surfaces allow maximum product identification and advertising.

If you have a problem in container design, write us for full details of our custom design service.

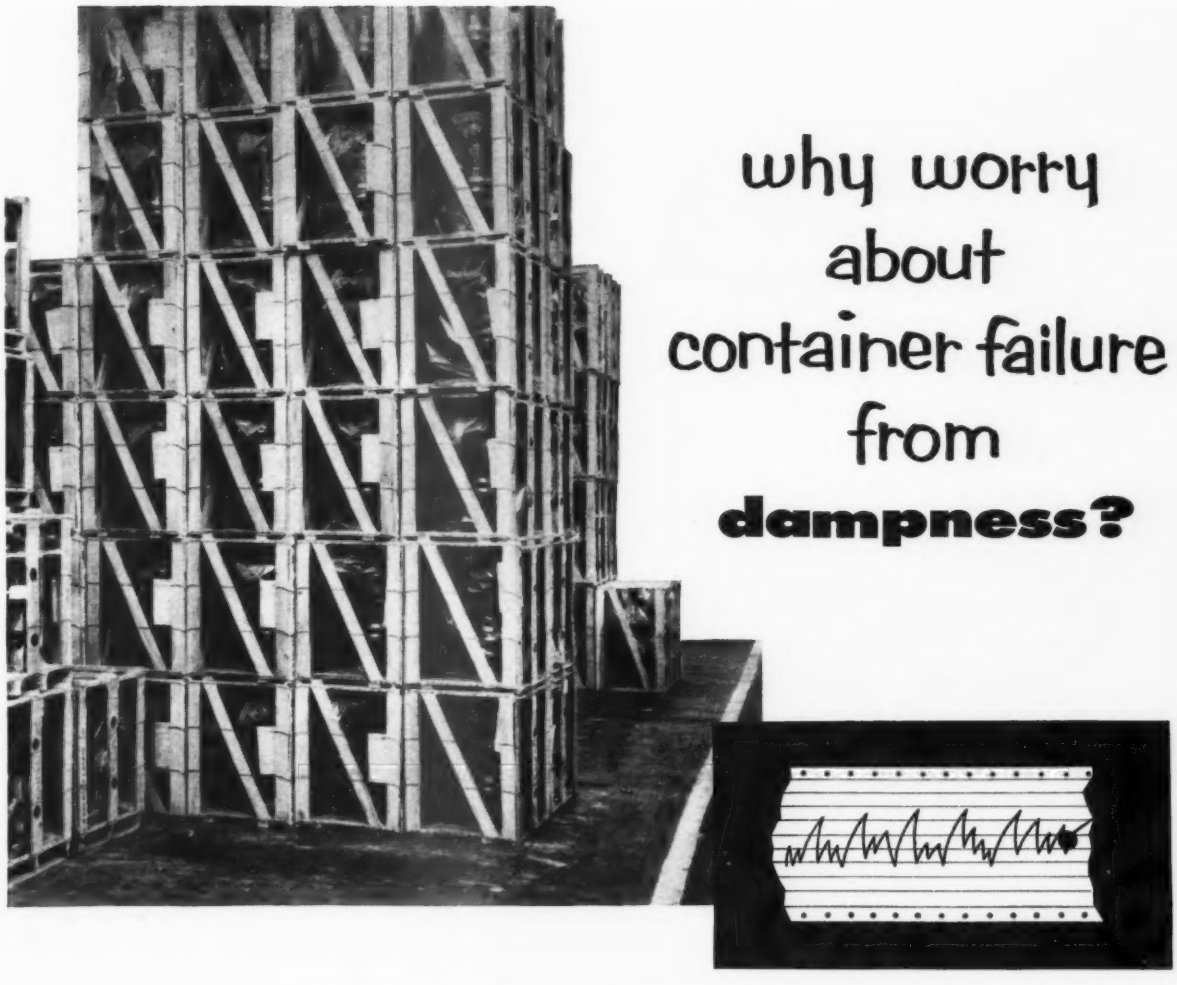


Warehouse experience shows cartons will stack six high without pallets.



Lift truck inserts the lifting flange under one side of cap, pulls up. Strong construction enables sure, fast lifting, close stacking without usual jostling.

International Paper company
CONTAINER DIVISION
220 East 42nd Street, New York 17, N. Y.



why worry about container failure from **dampness?**

protect your product with

wirebound

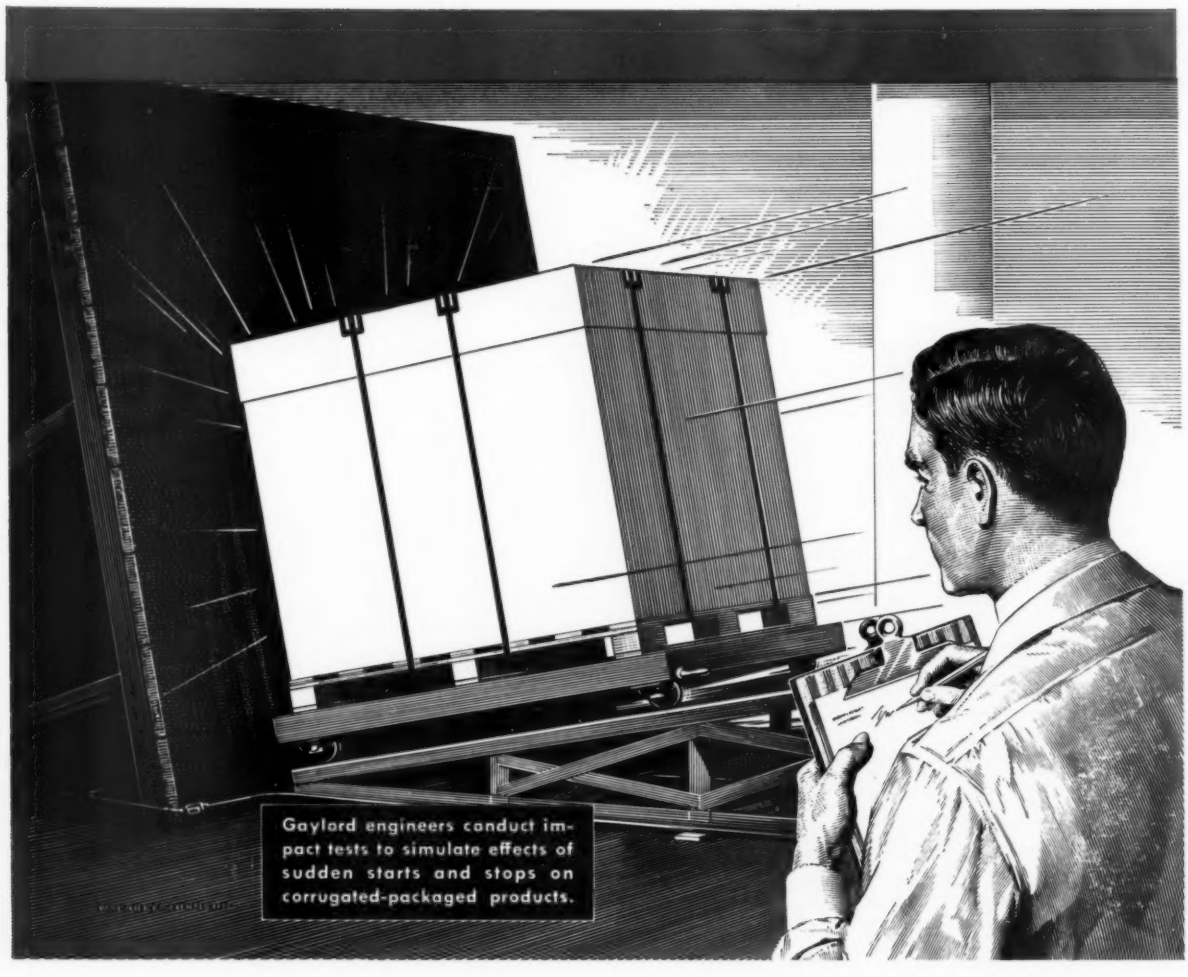
Dampness or direct contact with water does not harm durable Wirebound containers.

Containers made from other kinds of materials are often reduced to the point of collapse, cannot be stacked safely when stored under damp or humid conditions or exposed to unexpected wetness. This type of damage adds considerable expense and difficulty which must be figured into the total cost of packing, handling and shipping. The rugged wood and wire construction of Wirebounds, however, provide a container unaffected by moisture. Wirebound boxes and crates assure the storage savings of high stacking . . . even under dampest conditions. Use Wirebounds to eliminate all extra hidden and unexpected costs—know your total cost in advance.

Write for informative booklet, "Materials Handling, Stacking, Warehouse Applications."

Wirebound
BOXES & CRATES

WIREBOUND BOX MANUFACTURERS ASSOCIATION
Room 1154, 327 South LaSalle Street, Chicago 4, Illinois


Gaylord engineers conduct impact tests to simulate effects of sudden starts and stops on corrugated-packaged products.

HOW PRE-TESTING CUTS SHIPPING DAMAGE

Gaylord Boxes

Your product packaged by Gaylord can take its first trip over the road of distribution inside our laboratories. As a member of the National Safe Transit Program, Gaylord conducts unsparing tests duplicating the actual hazards of shipment.

This is only one phase of Gaylord engineering research which helps reduce shipping losses in every major American industry.

Make sure your boxes are performance-proved before they get their travel orders. Call your nearby Gaylord engineer. He likes tough challenges.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

Lightweight overhead conveyor aids production at Stratton and Terstegge

a fifty per cent increase in production capacity, lower production costs, and an important increase in floor space are reported in this article

AT THE Falls City Division of the Stratton and Terstegge Co., Louisville, a lightweight overhead cable conveyor system has helped bring such advantages as a 50 per cent increase in productive capacity, lower labor costs, better painting and assembly methods, and in effect, an important increase in floor space. In addition, the relatively low cost and flexibility of the cable conveyor permits its use to an extent that would not be feasible economically with other types of conveyors.

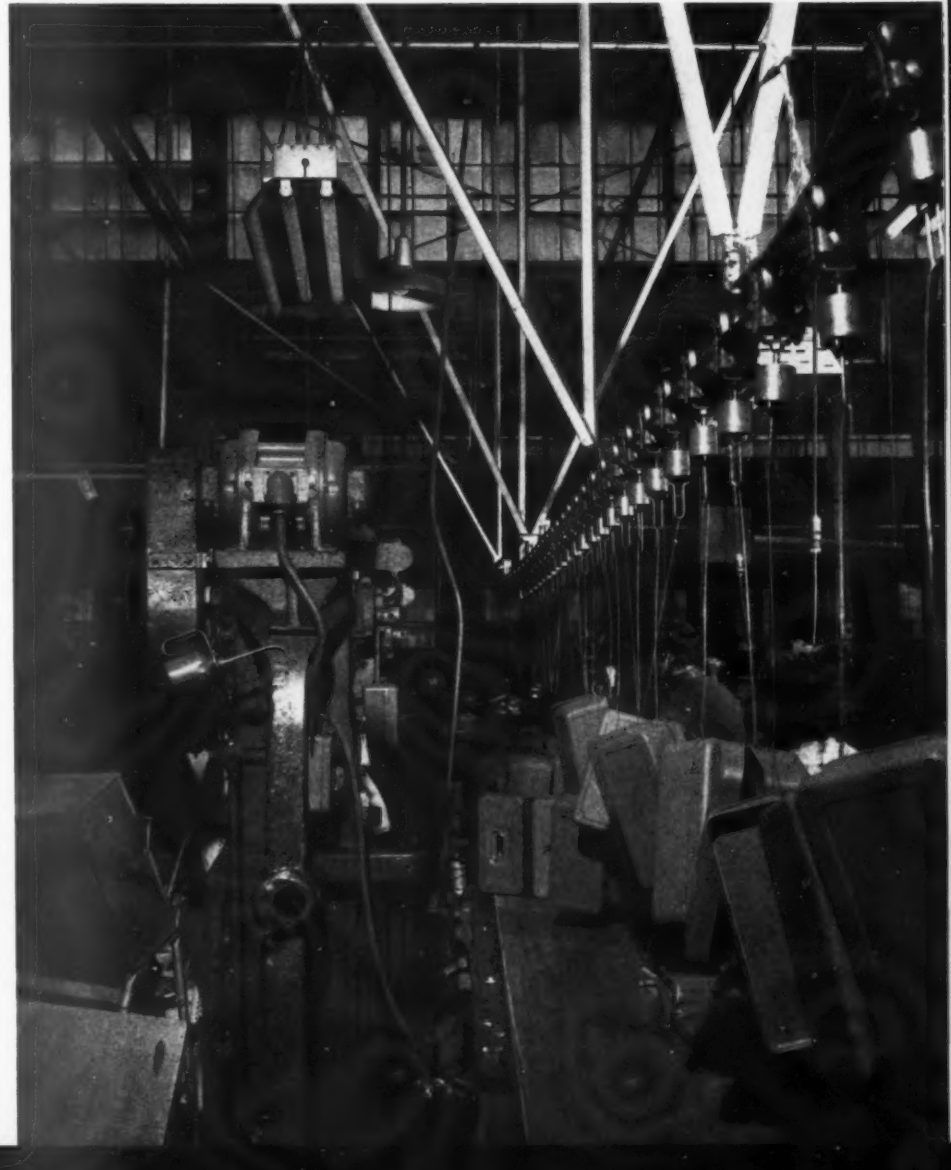
At this plant, deep-drawn components of metal fishing tackle and utility boxes are hung on the continuously moving cable conveyor at one point and are never removed until they reach the final assembly line. The parts pass through a burn-off oven (eight minutes at 650° F.), an air cooling interval, hand spray painting, electrostatic spray, flow-out, and a bake oven (16 minutes at 230 to 270° F.) on a cable conveyor installation 700 feet long.

Inexpensive air cooling

Charles M. Long, production manager, says that leaving the box covers and trays on the conveyor line for air cooling would have been too expensive with any other type of overhead conveyor.

"Naturally, we have to cool the parts after they leave the burn-off oven and before they are painted," Long points out, "and it is advantageous to do this by conveyor. We felt the relatively small additional investment required for an extra stretch of cable conveyor was well worthwhile. Otherwise we would have to put in some kind of equipment for forced cooling.

The same thinking led to leaving the parts on the conveyor for flow-out after they have been painted, and before they enter the baking oven.



FINAL ASSEMBLY LINE for metal fishing tackle boxes shows hardware being applied as they move by conveyor on an overhead cable at the Falls City Division of the Stratton and Terstegge Co., Louisville, Ky. Parts are hung on the continuously moving conveyor immediately after being deep drawn, and are never removed until they are ready for final touches. Conveyor installation helped bring a 50 per cent increase in productive capacity and released an important area of floor space.

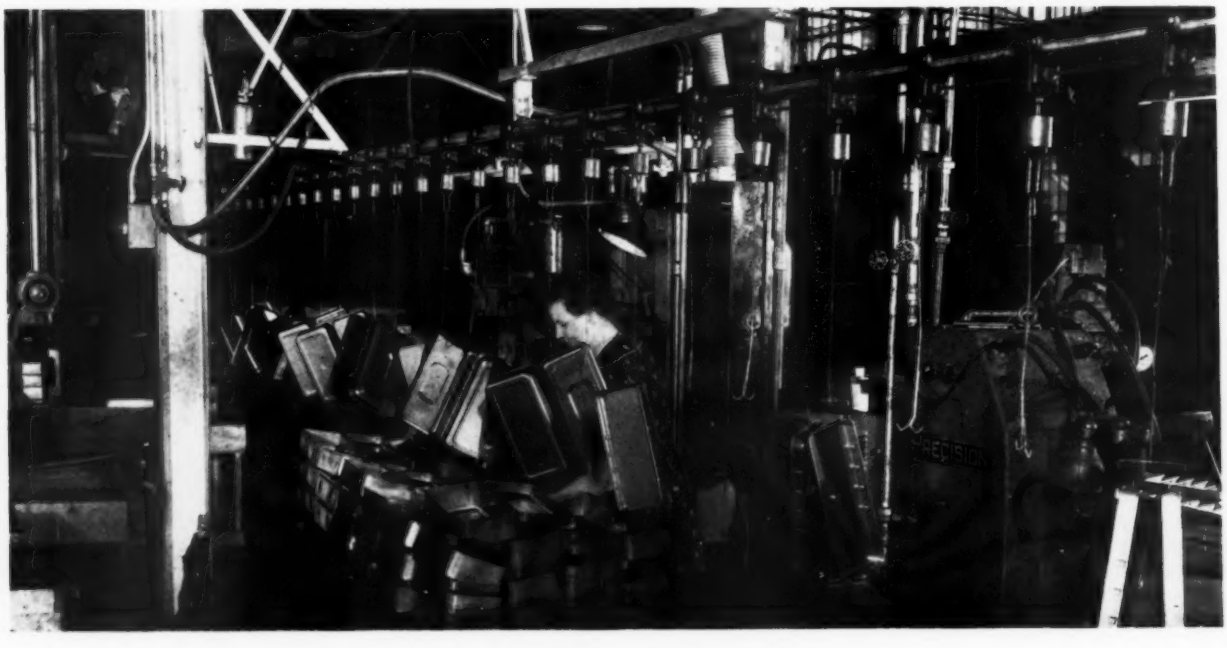
Installing the burn-off oven, and running the conveyor through it, has brought the biggest change in the plant's processing methods, a plant spokesman reports. Formerly, parts were cleaned in an industrial washing machine. The parts were brought to the washer on gravity rollers, which took up floor space, and two men were needed to feed the washer. A maintenance man spent a couple of hours daily in checking the machine.

These labor costs were immediately eliminated with the oven and overhead conveyor combination, and approximately 2,000 ft. of floor space was released for other purposes.

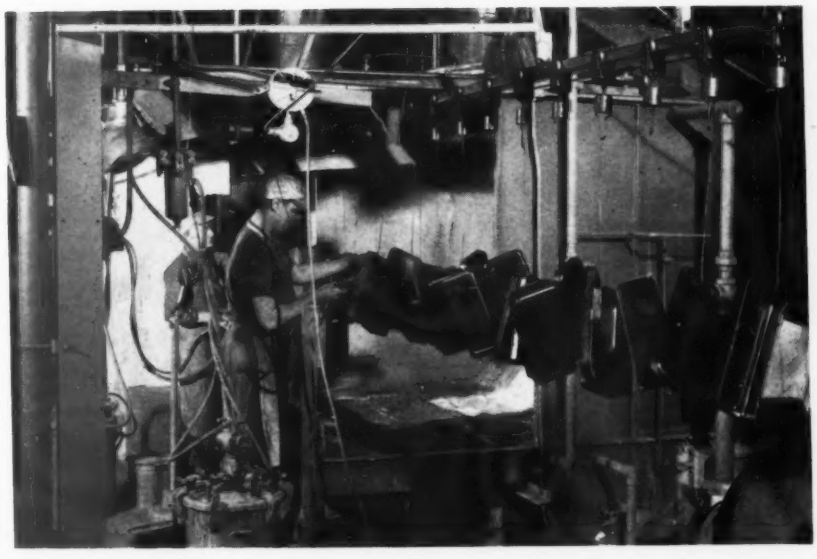
At the electrostatic spray station, the conveyor hooks holding the parts are caused to revolve slowly as vertically mounted rollers below the conveyor trolleys pass between two horizontal metal strips. The parts revolve nine times as they pass through the six-foot-wide painting area, and are thus thoroughly and automatically painted. Speed of the conveyor through the painting process can be varied from three to 14 ft. per minute—the larger the parts being painted, the slower the speed.

Only two electric motors, separated at the extreme ends of the system, are needed to drive the conveyor. The motors are 3/4-horsepower each.

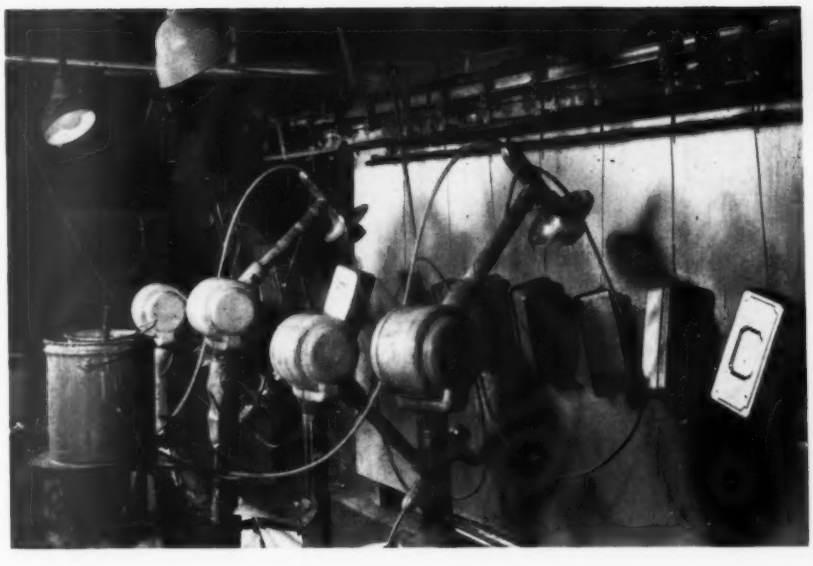
CLEANING-PAINTING-ASSEMBLY cycle begins at this point (photo below), where covers and trays for metal fishing tackle and utility boxes are received from the stamping department (right of picture) and are hung on the conveyor. The woman operator shown works at the unloading end of a projection welder where hinges are assembled to boxes. Alternate hangers hold trays.



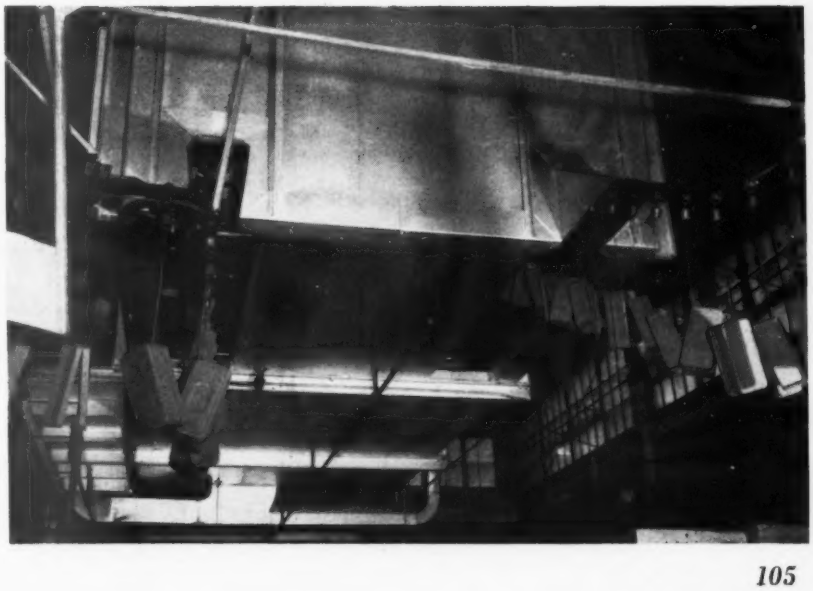
BURN-OFF OVEN installation helped to release 2,000 feet of floor space. Conveyor leading to the oven (left of photo) is in the rear, while the parts in the foreground have come from the oven. Parts are in the oven eight minutes at 650° F.



COVERS AND TRAYS for boxes are hand spray painted on the inside while remaining suspended from a moving conveyor. Before painting, the parts are air-cooled on the conveyor after leaving a burn-off oven.

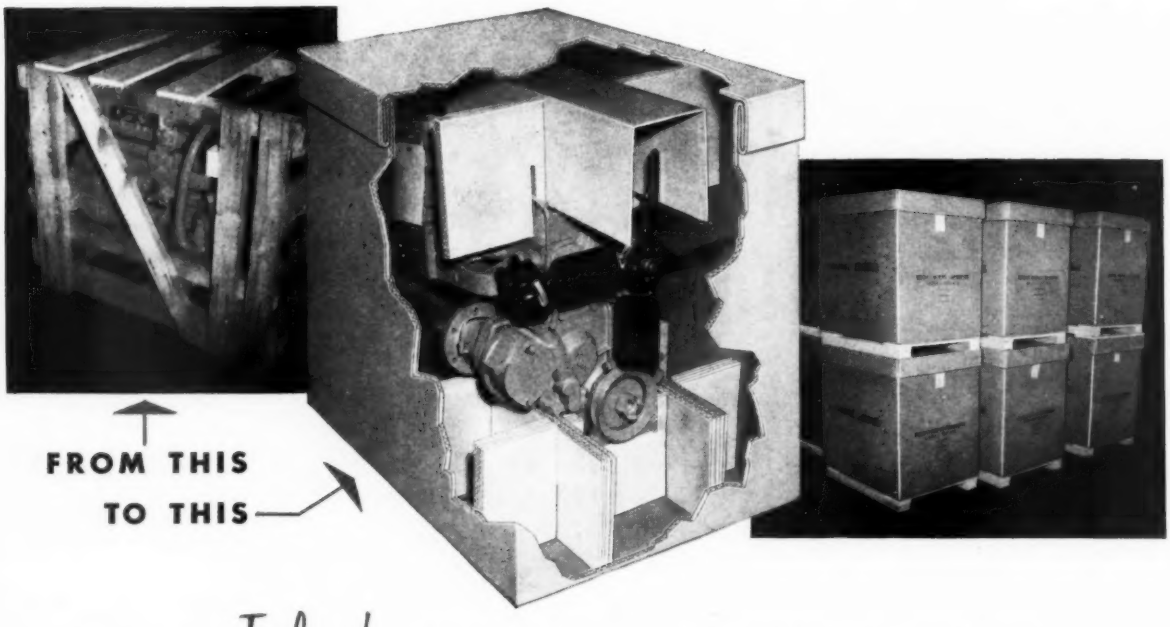


REVOLVING HOOKS of conveyor carry components of tackle boxes past an electrostatic spray station. Vertically mounted rollers below the conveyor trolleys are caused to rotate by friction as they pass between two horizontal metal strips. Speed of the conveyor through the painting process can be varied from three to 14 feet per minute —the larger the parts being painted, the slower the speed.



OVERHEAD BAKE OVEN through which tackle boxes and trays move after being painted. Conveyor is suspended from building framework. Only two electrical motors of ¾-horsepower each are needed to drive 700 feet of conveyor.

HOW *Inland* DESIGN LEADERSHIP SAVES YOU MONEY



Result: *Inland* SAVED *100 Pounds* SHIPPING WEIGHT PER UNIT for this Customer*

● This 525-pound, 6-cylinder gasoline marine engine was shipped for years in the bulky wood crate shown above, which added 125 pounds to the shipping weight. But when Inland engineers were put on the job, they found the way to ship these same engines *more safely*, in corrugated containers weighing only 25 pounds, complete with bottom pallet.

But shipping costs weren't the only savings accomplished. The costs for packaging materials and labor were reduced more than 50% per unit! In addition, the Inland corrugated containers have sufficient compression strength to permit 2-high shipping and warehousing, and are designed to provide complete protection for the engines, even if they should be turned upside down.

Your Inland package engineer is a *corrugated shipping container specialist*. When your product packaging is entrusted to him, you can be sure you are getting the benefit of every possible packaging economy applicable to your product.

*Name on request.

Inland Boxes Build Good Will

Send for this booklet fully illustrating Inland's services, facilities and products.

CALL YOUR INLAND PACKAGE ENGINEER

INLAND BOXES

INLAND CONTAINER CORPORATION

INDIANAPOLIS 6, INDIANA

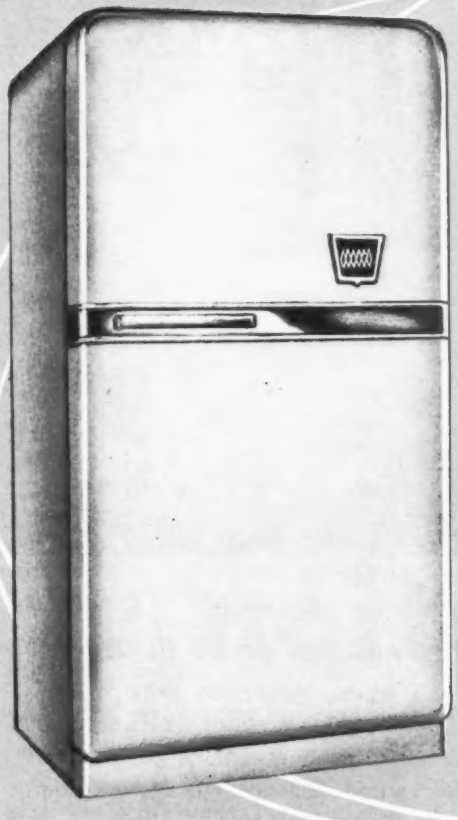
Corrugated Fiber Boxes

MILLS: Macon, Georgia; Rome, Georgia. **PLANTS AND SALES OFFICES:** Indianapolis, Indiana; Middletown, Ohio; Milwaukee, Wisconsin; Evansville, Indiana; Detroit, Michigan; Macon, Georgia; Erie, Pennsylvania; Ashtabula, Ohio; Orlando, Florida; Rome, Georgia; Biglerville, Pennsylvania.

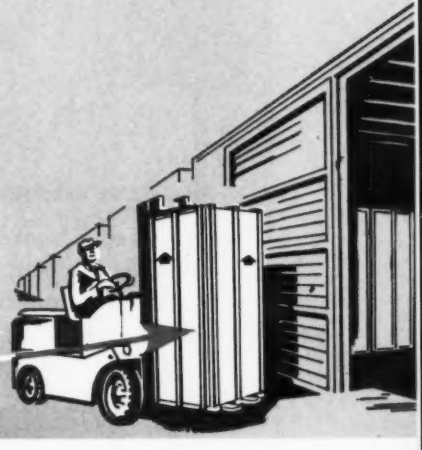
Other Sales Offices in Principal Cities · Consult Your Telephone Directory

the new

QUICFREZ



The new Quicfrez — another fine product properly protected for safe shipment through the use of Watkins Containers.



The Finest Products Go In Watkins Containers

They are preferred because of:

1. Low Cost
2. Stacking Strength
3. 75% Assembled–Upon Receipt
4. Ease of Assembly
5. Easy Handling
6. Minimum Storage Space
7. Protection from Dust and Dirt

Custom Protection . . .

THE **WATKINS CONTAINER** MANUFACTURERS

THESE COMPANIES BUILD WATKINS CONTAINERS

COZIER CONTAINER CORP.
446 East 131st Street, Cleveland, Ohio

CRATE-RITE MFG. CO.
1015 Orient Street, Oakland 7, California

DURA-CRATES, INC.
940 E. Michigan St., Indianapolis, Ind.

HEMB & MARTIN MFG. CO.
P.O. Box 108, Murfreesboro, Tennessee

ILLINOIS BOX & CRATE CO.
811 Center Street, Plainfield, Illinois

KIECKHEFER BOX & LUMBER CO.
1711 W. Canal St., Milwaukee 3, Wis.

LOVE MFG., INC.
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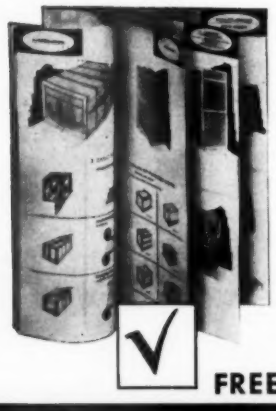
UTILITY CRATE CORPORATION
2019 Immaterial St., Los Angeles 21, Calif.

MANITOWOC FREEZERS
Protect Their Quality

in CHICAGO MILL SHIPPING CONTAINERS!

Protection...

is assured of freezers manufactured by the Manitowoc Equipment Works, Manitowoc, Wisc., — and of *your products,* against Damaged on Arrivals, Hidden Damage Claims, Costly Returns and Customer Dissatisfaction, when shipped in Chicago Mill Containers. 76 years of experience, modern designing and testing, and great diversification are among the reasons Chicago Mill can provide you with economical containers that protect your products from shipping hazards.



Only Chicago Mill *MAKES 'EM ALL!* The Most Diversified Line, utilizing Craveneer, Corrugated, Plywood, Veneer and Resawed Materials!

FREE! *Illustrated catalog describing Chicago Mill shipping containers and services.*

CHICAGO MILL AND LUMBER COMPANY
33 South Clark Street — Chicago 3, Illinois

PLANTS
- CHICAGO, ILLINOIS
- GREENVILLE, MISSISSIPPI
- HELENA, ARKANSAS
- ROCKMART, GEORGIA
- TALLULAH, LOUISIANA

Safe Transit Personals

→ *from Page 99*

Arthur B. Damon, general manager of the Container division of International Paper Co., recently announced several new appointments designed to further improve service to the division's customers.

Philip C. Strine, formerly manager of Eastern sales, was named general sales manager of the division. *C. R. McMahon* was appointed manager of Eastern sales, and *Edward Agar* was named manager of Southern sales, a new divisional position.

Continuing in their present positions are Stanley B. DeMian, manager of Western sales; Lee M. Smith, general manager of West Coast container operations, and Donald B. Pooley, manager, West Coast sales.

M. M. Clairmont, chairman of the executive committee of Atlas Plywood Corporation, announces the appointment of *David W. Wollin* as executive vice president and chief executive officer of the company. Wollin will be responsible for the management and operations of the corporation and its subsidiaries.

Previously, Wollin had his own management consultant business with offices in New York City and Bridgeport, Conn. Recently he resigned as president and director of the J & J Rogers Co.

Supplier Personals

→ *from Page 96*

The new president is a past president of the sales executive council, Karl Turk is past president of the Associated Industries of Maryland, and is a trustee of the Hargrave Military Academy of Chatham, Va. Reuling is a past president of the Baltimore Chapter of the National Association of Cost Accountants.

KARL TURK

REULING

L. C. Colleran has been named sales manager and *W. P. Cooper, Jr.* assistant sales manager of Roll Formed Products Co., Youngstown, Ohio.

NOW! LOW COST, STRONGER AND BETTER SHIPPING CRATES...

BIGELOW-GARVEY'S Exclusively Designed Tight-Corner Collapsible, Hinged Crates offer manufacturers finer quality and important price advantages.

ENGINEERED

B-G Quality Hinged Crates, Pallets, Pallet Boxes, etc. are built to meet your specific requirements and to give utmost protection to your products.

SAFE

B-G Tight-Corner Containers are engineered to assure safe delivery of your product.

ECONOMICAL

Factory assembled in 3 sections. Palletized for quick handling and storage,

TIME SAVING

Exclusive Tight-Corner, Collapsible, Hinged Containers have pre-drilled nail holes for fast assembly.

LOWER SHIPPING COSTS

Our Sales Engineering Department will show you how our 33 years of Packaging Engineering experience can lower your over-all shipping costs.

•

Write or Call for B-G Sales Engineer TODAY

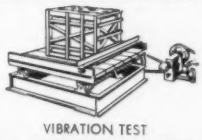
B-G EXCLUSIVE TIGHT-CORNER

Palletized for fork-lift handling. Convenient for unloading. Gives increased storage space and reduces handling costs.

PRE-TESTED

INCLINE IMPACT TEST

Your Packaged Product, packed in its own B-G Container, is pre-tested in our certified laboratory to meet all National Safe Transit Procedures.



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PEI Mid-Year Conference

→ *from Page 84*

program. The program's accomplishments were studied and evaluated, and a subject of the session was how to make the most effective use of the data compiled, with specific instructions on charting company trends against composite industry trends.

Under the General Enameling session, held Friday morning, and presided over by W. T. Porter, Porcelain Metals Corp., chairman, General Enameling division, the program and activities of the division were directed to two general areas: Activities of specific interest to companies doing general enameling or jobbing work; and supervision of activities of an "across the industry" type which are of prime interest to all companies with porcelain enameling facilities. Among the speakers taking part in the discussions covering the morning's proceedings were: C. E. Meyer, Barrows Porcelain Enamel Corp.; John C. Oliver, managing director, PEI; Howard Russell, Ingersoll Products division, Borg-Warner Corp.; Hugh Patton, Ingram-Richardson Mfg. Co.; and Wm. H. Lowry, Vitreous Steel Products Co.

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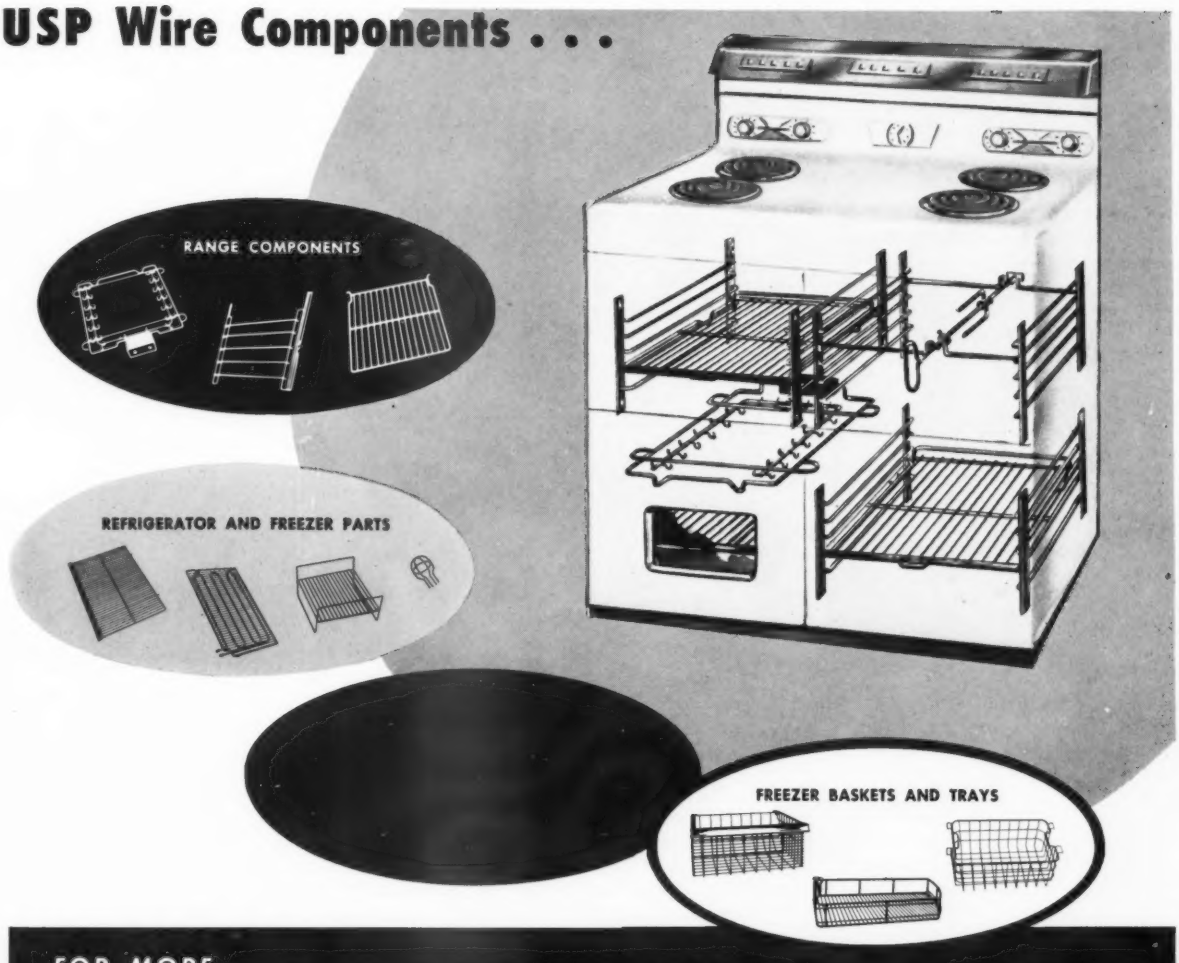

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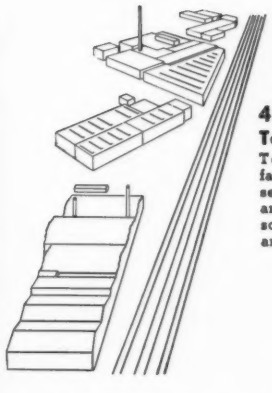

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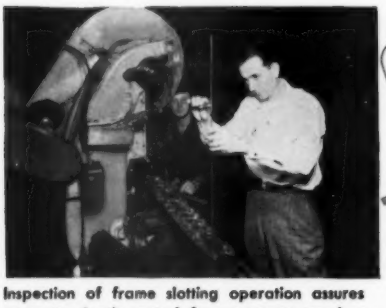
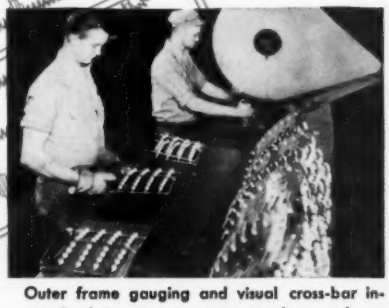


Inspection of frame slotting operation assures accurate depth control for necessary crossbar "breathing space."



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